1964

A management approach to shipyard overhauls.

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Monterey, California: U.S. Naval Postgraduate School

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by

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Submitted in partial fulfillment of
the requirements for the degree of

MASTER OF SCIENCE
IN
MANAGEMENT

United States Naval Postgraduate School
Monterey, California

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This work is accepted as fulfilling

the research paper requirements for the degree of

MASTER OF SCIENCE

IN

MANAGEMENT

from the

United States Naval Postgraduate School

ABSTRACT

The dollar expenditure for a ship's regular shipyard overhaul far exceeds the total maintenance costs for the entire period between overhauls. An overall ratio of about three to one exists. Such highly concentrated spending within a relatively short time period obviously must be given its due share of knowledgeable planning and organization. All phases and elements of the overhaul require precise coordination. The execution of the overhaul demands fine elements of control and direction toward the goal of attaining maximum ship readiness within the resources available. These five key words spell out the five Principles of Effective Management.

The modern naval vessel is a very complex product of man's ingenuity in fashioning tools of war. Its care and maintenance should not be left to mere chance; there exists a full array of written documentation on the subject. It is a matter of searching out these precise instructions, digesting them, and then putting them into planned use. It is the object of this paper to provide a sequential flow of documented information and events leading to an improved management approach to a well planned and well executed ship overhaul.

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CHAPTER I

INTRODUCTION AND PURPOSE

Introduction

The total dollar outlay for a single vessel's shipyard overhaul far exceeds the total dollars spent for maintenance during the entire operating cycle between overhauls. For example, a destroyer's allotment (OPTAR) of Supplies and Equipment funds for a year is approximately $80,000; the funds for materials during upkeeps and for voyage repairs (ROV) average about $30,000 annually. On the other hand, a typical destroyer overhaul performed every 2 to 3 years costs over $500,000 from the Type Commander's funds, plus an even larger amount from Bureau of Ships for new equipment and installation costs. A non-nuclear submarine's annual OPTAR and ROV expenses are approximately those of a destroyer; however, its overhaul costs approximate $1,400,000 from the Type Commander, plus $500,000 Bureau of Ships installation funds for some equally expensive new equipment. And we haven't mentioned the funds provided by the Bureau of Weapons for ordnance alterations and repair!

The overall figures extracted from a recent annual Navy budget proposal for Ship Maintenance and Operation showed the following: For some 880 active ships the budgeted Supplies and Equipage funds were $125 million, and the Repair on Vessel (ROV) funds were $60 million. For the 260 ships to be overhauled and modernized during that year the budget showed $170 million for alterations and improvements and $235 million for repair and overhaul.[1] On top of this we must add the many

millions of dollars for new equipment and for the ordnance repairs and alterations accomplished during the overhaul periods.

It is obvious from the above statements that we must take a revised and more complete management approach toward the planning and execution of the overhaul and modernization of our ships.

The overhaul and modernization effort is divided into two general areas: 1) the modernization and improvement of the ships and equipment, and 2) the maintenance and overhaul of existing ships and equipments. Principal effort in the preparation and coordination of the modernization and improvement (the Fleet Improvement Plan) is centered in CNO, the Bureaus, and the Fleet Commanders-in-Chief. The major effort in the maintenance and overhaul aspect is assigned to the ship's officers and the sea-going staffs. A very heavy burden of preparation and execution of the overhaul falls on the ship's Department Heads, the very energetic and conscientious, but often young and inexperienced, Lieutenants and Lieutenants Junior Grade. Their written guidance is contained in the countless directives, letters, memoranda, instructions, pamphlets and technical manuals that fill our library shelves and drawers. The bulk of this information must be simplified and woven into a clear and concise sequence of meaningful events. Given a logical development of each of the many facets of ship maintenance and ship modernization, the Department Heads will have a clearer and better grasp of the total problem and its dependent parts. They will be better able to apply the necessary management principles of planning, organization, coordination, control, and direction toward

the goal of gaining maximum ship readiness with the resources made available to them.

Purpose

It is the purpose of this paper to assemble and organize into one package such information and references as should be understood by each ship's company in order to plan and execute the "best" overhaul for the funds allocated to it. Principal points to be developed will be:

1. Pre-overhaul planning by outside activities:
   a. CNO and Bureau formulation of the Fleet Improvement Plan
   b. Fleet Commander and Type Commander inputs
   c. Advance planning by the Shipyard
2. Preparations by the Ship:
   a. Review of recommendations of the Board of Inspection and Survey, and Bureau of Ships and Bureau of Naval Weapons Alteration Letters
   b. Preparation of work lists for shipyard work, tender work and ship's force work
   c. Review of work lists by Squadron and Type Commander
   d. Review of work lists by Shipyard; Pre-overhaul inspection; Time and cost estimates.
3. Overhaul Execution
   a. Shipyard organizations and functions - Government and private yards
   b. Shipyard cost procedures - NIF

c. Arrival Conference

d. Scheduling and Follow-up of Job Orders

e. Inspection - Tests - Signing off completed jobs

f. Supply overhaul (SOAP)

g. Blueprints - Allowance Changes - Record Keeping

h. Sea Trials and Completion of Overhaul

i. Ready for Sea

Limits of Scope of Problem Treatment

Under CNO sponsorship[2] a major effort is currently being made toward increased fleet readiness through improved maintenance management - a program termed "Planned Maintenance System."[3] This program has two major phases: a) the development and implementation of a standard system for management of planned maintenance throughout the operating forces, and b) the development and implementation of a uniform Maintenance Data Collection System in support of the maintenance and material management program for the ships and squadrons of the operating forces. This program is presently being phased into the operating forces (air and ship) with a full implementation planned by 1966. It is this author's belief (after reading available information) that this program is aimed principally at the maintenance periods between overhauls. It is my purpose to complement that program with a management approach to the modernization and maintenance of ships during their shipyard overhaul periods.

In order to make this article meaningful to all shipboard officers regardless of the type of ship in which they are serving, the statements made will be generalizations, rather than specifics to cover each detail.

The specific details for the ship class desired can be obtained from the footnoted references. Such non-specific statements will provide the two-fold purpose of keeping the paper "Unclassified", and not inclined to be outdated by minor revisions or updated reference material.

This paper will limit itself to programs dealing with the Active Fleet. Whereas the Reserve Fleet ships are dealt with generally in similar manner, the number of specific variations would unnecessarily complicate an otherwise simple sequenced explanation for active ships.

The current state of the reorganization of the Navy under General Order No. 5, implementing many of the Dillon Report[4] recommendations, creates a limbo of "who does what." As the new alignment of functions and responsibilities become clearer, certain of the statements made herein will need updating by the reader.

CHAPTER II

LONG RANGE PLANNING

Pre-overhaul Planning by Outside Activities

Chief of Naval Operations (CNO) policy on ship maintenance states that all ships will be maintained in the highest degree of material readiness possible within the resources made available.[5] Toward this goal a series of responsibilities for the planning and execution of ship maintenance and ship modernization are established. This section will deal briefly with the overall concepts and programs carried out by CNO, the Fleet and Type Commanders, and the various Material Bureaus now organized under the Chief of Naval Material (CNM).

CNO's Ship Maintenance and Modernization Functions

The maintenance and modernization responsibilities assigned to CNO are as follows:

1. Coordinate the efforts of the material bureaus (under the new organization, through CNM), the operating forces and the shore establishment in regard to the maintenance and improvement of ships.
2. Establish policies for regular shipyard overhauls of all ship types.
3. Establish the priority of work to be performed by naval shipyards.
4. Establish the duration of and intervals between regular shipyard overhauls for the various types of ships.

5. Develop, promulgate, and keep under review the annual schedule of regular overhaul, interim availabilities, post-shakedown availabilities and inactivations.

6. Approve and establish priority of alterations affecting ship military characteristics, and promulgate the Material Improvement Plan, as set forth in the OPNAV Instruction 4720.10A.

Several of the above functions bear amplification and explanation in more detail.

With respect to item 3 above, the priority of work within the shipyard's workload is governed by OPNAV Instruction 4700.2B.[6] This establishes an overall Navy priority of "first things first" and avoids a system of individuals getting preferred treatment because of seniority, personal pressure, etc. Here are the highest priorities in order:

a. All industrial work associated with Polaris Program
b. Emergency repairs including Voyage Repairs
c. Urgent repairs to vessels being deployed (Fleet Commanders designate specific vessels on a case basis)
d. Urgent repairs during restricted or technical availabilities
e. Regular overhauls
f. Conversion overhauls (FRAMS)
g. New construction, fitting out of new ships, activating of reserve fleet, post-shakedown availabilities
h. Others as designated

It is apparent from this priority listing that regular overhauls and FRAMS are rated after much more urgent shipyard work (e.g., Voyage repairs after a typhoon in Middle or Western Pacific can suddenly monopolize most of the capability of the Pearl Harbor Naval Shipyard, at least for certain shops such as welding and shipfitting. Overhaul work must then wait.)

In amplification of item 4 above, generally the interval between overhauls varies between 18 and 36 months; this period depends principally upon ship type, age of the vessel, maintenance funds available for the fiscal year, availability of critical planned equipment, and the operational schedule of the ships concerned. OPNAV Instruction 4710.29 extends overall guidance on this subject. Detailed instructions from your Fleet and Type Commander will delineate the interval more specifically for your ship. The duration of this overhaul is similarly established, and varies generally between 2 months for the smaller, less sophisticated ships, to 6 months or more for the SSN and CVA. The SSBN is a separate matter. FRAM overhauls and conversions are also separate cases.[7]

Item 6 above warrants extensive explanation and detail, for it becomes the heart of understanding what is called the Military Improvement Program (MIP) for ships. The primary agents within CNO for this program are the Ships Characteristic Board (SCB) and the Military Improvement Plan Board (MIP Board). The basic guidance in this area is to be found in the following three OPNAV Instructions: #4720.10A, #4720.2A and #4720.49A.[8] A digest of their functioning will follow.

Alterations are of two basic categories: 1) those affecting the military characteristics of a ship, and 2) those of an operational but non-military nature, and which are principally concerned with safety of personnel and equipment and the efficiency of design. The clarification of this division suggests several strange terms such as MIP, CIP, CIP, FIP, CMI and SIG. They will be defined as we progress.

Military Improvements

Ideas from the Navy's research program, the Fleet, BUSHIPS, and the Board of Inspection and Survey (INSURV) are considered by the Ship Characteristics Board (SCB). Those developments showing promise are incorporated into Catalogue of Material Improvement (CMI) project cards. When tests and evaluations are successfully completed and the equipment is "service approved" by CNO, the SCB publishes the items as Ship Improvement Guide (SIG) project cards. Next the SCB determines what equipment will be installed on what class of ship. The designated items become a part of what is called the Class Improvement Plan (CIP). A CIP is a summary listing of those uncompleted projects and new improvement items affecting the military characteristics of a class of ships. Each class of ships has a CIP; it provides for the homogeneous improvement of any single ship within the class. The CIP is published as a classified OPNAV Instruction.[9]

Implementation of the Class Improvement Plan in active ships is through the Material Improvement Plan (MIP). Here is how it works. Within CNO, the Director of the Ships Material Readiness Division (OP43) heads a MIP Board whose function is to advise and assist the SCB on

the matters of implementing the MIP. The MIP Board considers and resolves the following facets of the problem: What are the requirements of items for modernization of the ships? What is the availability of the material and equipment needed to accomplish the modernization? In what priority are the improvements to be ranked? What funds are programmed to accomplish the desired modernization for the specific fiscal year? What ships are to be affected for the fiscal year of interest? The overall MIP is programmed ahead about 5 years, and each fiscal year's MIP is taken from the 5 year listing. Comments from the Fleet Commanders-in-Chief, Service Force Commanders, Type Commanders and the Material Bureaus weigh heavily in MIP Board decisions. The MIP for a particular fiscal year lists the specific approved items for each of the ships designated for overhaul during that year.[10]

As with most other things in life, we want more alterations to be accomplished than we have funds for. Moreover, there is far too little space in the ships to fit it all into. Obviously a priority system must be established in order to have an effective improvement program. The MIP Board assigns a relative priority of alterations in accordance with the categories specified in OPNAV Instruction 4720.2A.[11] There are three broad classes of priorities. Priority 1 - Mandatory. The installation is mandatory to enable a ship to carry out its mission and designed tasks. Priority 2 - Required. The installation is required to achieve a major military gain, but a ship can carry out its mission and designated tasks without it. Priority 3 - Desirable. The installation achieves a significant improvement in the military improvement of the ship.

We now have the plan for executing the year's military improvements to ships; however, there have been some parallel actions developing in other parts of the Navy which we must look at before we get too far down the road.

As soon as the SCB approves the CIP item, the Bureau of Ships prepares a SHIPALT for the installation of the equipment or for otherwise accomplishing the alteration. The SHIPALT gives technical description to the alteration, designates ships to which it applies, and arranges for plan preparation by responsible shipyards. Ship alterations accomplishing military improvement are also termed NAVALTS, differentiating them from the non-military improvements. Based on the planning included in the MIP for future years, BUSHIPS enters into contracts with various manufacturers for production of the necessary equipment.[12] Since procurement frequently takes 12-18 months or more for delivery, scheduling of delivery for planned overhaul dates becomes a major chore. Naturally we want the most modern equipment delivered yesterday! Funds for equipment procurement are separate from funds for the equipment installation. Procurement is from OPN (Other Procurement Navy). Unfortunately these funds frequently are insufficient from the point of view of the Operating Forces.

By separate but similar procedures, the Bureau of Naval Weapons (BUWEPS) contracts for BUWEPS furnished weapons and fire control equipment. The Bureau of Supplies and Accounts (BUSANDA) contracts for supporting spares and equipments in coordination with BUSHIPS and BUWEPS. The Bureau of Naval Personnel must establish training courses and provide associated training materials. The procurement of materials by the

various bureaus is conducted under the overall policies and procedures established by the Secretary of the Navy through the Office of Naval Material (ONM).

Operational Improvements

While the above procedure is evolving for the military improvement alterations, a similar procedure is transpiring in the Bureau of Ships for the non-military or Operational Improvement Program (OIP) items. Logically this should be discussed later under BUSHIPS responsibilities; however, to provide continuity of development of the alteration planning stage, it will be discussed in some length here.

As a result of casualty reports, machinery failure reports, letters and recommendations from the fleet, and from ideas developed within the shipyards and bureaus, the Bureau of Ships prepares SHIPALTS for ships and equipments to improve such aspects as safety of operation, design efficiency, and reliability. Within the Bureau of Ships the Fleet Improvement Council reviews these proposed alterations for assignment of Category and Priority Designation. There are three principal Categories: Class A - Mandatory. Ship and personnel safety; Class B - Essential. Improvements in mission reliability and personnel safety improvement; Class C - Desirable. Improvements in operation, morale improvement, operational efficiency, and maintenance facility. Within these categories specific priority numbers are assigned from 1 to 80 for Class A, 81-266 for Class B, and 267 and higher for Class C. Within the limited funds available for alterations of the Operational

Improvement type, few priorities beyond number 80 have been accomplished during recent years. Thus the original priority assigned by the Fleet Improvement Council is all-important.

The list of fundable OIP items for the year are combined with CNO's MIP items for the year into a BUSHIPS document called "The Fleet Improvement Plan for Fiscal Year 19XX." More will be said about this later.

Bureau of Ships Ship Maintenance and Modernization Functions

The maintenance and modernization responsibilities assigned to the Bureau of Ships are as follows:

1. Establish operating policies and workload limitations at the various shipyards in accordance with current requirements and with U. S. Navy Regulations.[13]
2. Review regular overhaul schedules as recommended by the Fleet Commander-in-Chief; submit the adjusted schedules to CNO for promulgation.
3. Furnish timely information relative to the prospective workload of East and West Coast shipyards to the respective active Fleet Commanders-in-Chief for their guidance; and recommend changes to scheduled overhauls to maintain workload balance and to avoid excess overtime.
4. Take action to follow up and correct deficiencies in maintenance or material readiness brought to the Bureau's attention.[14]
5. Approve and establish priority of alterations coming under Bureau of Ships' cognizance (OIP items).

6. Prepare and promulgate the planned alteration program for active fleet ships as established by CNO plus the alteration program for the Reserve Fleet and the Naval Reserve Training ships.

7. Budget for, and allocate annual funds for ship overhauls, repairs, and alterations.

8. Initiate procurement action on Bureau furnished equipment for ship maintenance and modernization programs.

Items 5 and 6 bear further amplification. Earlier we described the development and promulgation of the MIP by the Chief of Naval Operations. We also described the development of the OIP by BUSHIPS. After the budget for the fiscal year is firmed up, BUSHIPS combines the two lists into the Fleet Improvement Plan (FIP) for the Fiscal Year. It is issued as NAVSHIPS 250-408-1 (under cover of a BUSHIPS letter) approximately 1 April annually (90 days before start of fiscal year.) A page from the Fleet Improvement Plan for Fiscal Year 1964 is shown as Figure 1. Notice that the FIP includes only those designated alterations which are within the fund limitations for the year. Alterations not appearing on the list are not to be authorized. The FIP is the principal document used to prepare the 120-day Letter of Authorized Alterations for shipyard overhauls.

The 120-day letter follows the contents of the FIP, except as modified by any of the following which may occur during the year: 1) programmed funds are reduced; 2) shipyard cannot accomplish the alterations within funds allocated by BUSHIPS; 3) delivery of necessary equipment fails to meet schedule deadline; 4) workload in the

shipyard precludes accomplishment within the time duration of the overhaul. The 120-day letter lists specific actions, the more important of which are: 1) it formally authorizes the designated alterations for accomplishment; 2) it establishes the overhaul time, place, and duration; 3) it establishes a dollar planning estimate for alteration work. If the shipyard cannot accomplish all alterations listed within the stated Bureau planning estimate, then the lower priority alterations are usually cancelled; 4) attached to the 120-day letter are the NAVSHIPS 4661 forms which list the Bureau furnished S-cog and F-cog material, their delivery schedule, and shipping data. An example of this form is attached as Figure 3. The 120-day letter is the authorizing document for alteration accomplishment. The BUSHIPS Type Desk Officer and his Project Engineer are in frequent telephone and personal contact with the shipyard and type commander representatives on these matters.

BUSHIPS responsibility item number 7 above assigns budget responsibility. The Chief, Bureau of Ships is assigned responsibility for overall budget preparation and budget execution for that part of the BUSHIPS sponsored Naval Budget termed "Operations and Maintenance, Navy (OMN)." Within the OMN appropriation is a budget activity titled "Ships and Facilities." Within this activity are budgeted the funds for 1) Supplies and Equipage expenses (OPTAR funds); 2) Restricted and Technical Availability expenses (ROV funds); and 3) Shipyard overhaul and modernization expenses. The Fleet Commanders-in-Chief (the consumers) have a major responsibility along with BUSHIPS in the preparation and justification of the budget estimates. After Congress appropriates the

funds which become the Navy's Fiscal Year budget, BUSHIPS acts as the agent for administration of the Ships and Facilities funds. A large portion of these funds are allocated to the Fleet Commanders-in-Chief for budget execution; specifically, they include Supplies and Equipage funds, ROV funds and Overhaul funds.

At this point it is advisable to define the meaning of Alterations, of the several Titles of SHIPALTS, and of Repairs.[15] Alteration - Any change in the hull, machinery, equipment, or fittings which involves a change in design, materials, numbers, location, or relationship of the component parts of an assembly, regardless of whether it is undertaken separately from, or incident to, or in conjunction with, repairs. There are three categories of alterations - "A" Alts, "D" Alts and "K" Alts. The category is assigned by the Bureau of Ships and is determined by 1) when it is done, 2) who funds the installation, 3) who programs and funds the materials.

Title "A" SHIPALTS

The letter "A" indicates an alteration to either a ship being built, or to a newly completed ship, or to a ship being converted and which is authorized and funded directly by BUSHIPS. Funds for accomplishment of Title "A" SHIPALTS are obtained from the continuing appropriation used to finance the construction or conversion of the ship itself (SCN funds), provided that the alteration is authorized prior to expiration of the obligation period for such funds. If the obligation period has expired, "A" SHIPALTS will be reclassified "K" or "D", as appropriate - see below. The Bureau of Ships programs and funds the equipment involved.

Title "K" SHIPALTS

The letter "K" indicates an alteration - other than an "A" alteration - which is authorized and funded directly by BUSHIPS. These SHIPALTS are normally authorized in the "120-day letter." BUSHIPS programs the equipment involved.

Title "D" SHIPALTS

The letter "D" indicates an alteration which is authorized by the cognizant Ship Type Commander and funded under the appropriate allotment received from his Service Force Commander. All costs of installation and of incidental material incurred in accomplishing alterations of this type are charged against the allotment. (Although authorized and funded for accomplishment by the type commander, BUSHIPS first approves of the alteration and issues it as a SHIPALT). Title "D" SHIPALTS may include the following:

1. Alterations-Equivalent-to-a-Repair (AER). An alteration may be designated as an AER if it involves: a) the substitution, without other change in design, of different materials which have previously been approved by BUSHIPS for similar use; b) the replacement of worn-out or damaged parts with those of later and more efficient design, as previously approved by the Bureau; c) the strengthening of parts which require repair or replacement to improve reliability, provided no other change in design is involved; or d) one or more minor modifications, requiring no significant changes in design or functioning of equipment, which are considered essential to prevent recurrence of unsatisfactory conditions.

2. Alterations accomplished by Forces Afloat (FA). Alterations in this category consist of operational improvements which will result in reduced maintenance. To be included as a Title "D" (FA) SHIPALT, an alteration must be capable of accomplishment by forces afloat without expenditure of funds for industrial assistance, and must not require "F" or "S" cognizance material.

Ship Maintenance and Modernization Functions by Other Material Bureaus (Bureau of Naval Weapons and Bureau of Supplies and Accounts)

A. CNO assigns the following responsibilities to BUWEPS:

1. Budget for, and allocate annual funds for repairs and alterations coming under BUWEPS cognizance.
2. Approve alterations coming under BUWEPS cognizance which do not affect military characteristics.
3. Submit comments relative to the Military Improvement Plan as set forth in OPNAV Instruction 4700.3B. (BUWEPS is active in MIP Board conferences and is a member of the SCB).
4. Budget for and procure BUWEPS cognizant equipment for the alteration and improvement program.
5. Take action to follow up and correct deficiencies in maintenance or material readiness brought to BUWEPS attention.

Most of the alterations and improvements in the BUWEPS area are military in nature and are incorporated into the MIP and are covered by BUSHIPS SHIPALTS. Other equipment and system modification or improvement is covered by BUWEPS ORDALTS, funded by BUWEPS. The ORDALTS are authorized for specific ship overhauls by a BUWEPS 150-day letter. The special equipment is budgeted for and funded by BUWEPS. (For

instance, BUWEPS will furnish a $603,000 MK37-1 torpedo director which BUSHIPS installs under SHIPALT 938K for $89,000). Close coordination of efforts must be maintained between CNO-CNM-BUWEPS-BUSHIPS and BUSANDA in this man-sided problem of Weapon System support.

B. The Bureau of Supplies and Accounts has budgeting and procurement responsibility for certain equipment and spares in support of ship operation, maintenance, and the overhaul/modernization program as discussed above. This is accomplished in close liaison with the other Material Bureaus and within funds allocated. The inter-relationship of supply support between BUSANDA and the Defense Supply Agency (DSA) will not be discussed in this paper.

The Fleet Commanders-inChief's Maintenance and Modernization Functions

As established by the Chief of Naval Operations, the responsibilities are:

1. Establish fleet maintenance standards to keep the operating forces at the highest possible degree of material readiness. Self maintenance by the forces afloat will be continued to the maximum extent practicable.
2. Conduct material inspections as set forth in OPNAV Instruction 5054.5 to determine the state of maintenance and material readiness of individual ships; take or recommend measures necessary to correct deficiencies.
3. Recommend to CNO and Chief BUSHIPS specific ships for overhaul. This includes dates, duration, location and interval between overhauls.

4. Assign all non-overhaul availabilities as listed in U. S. Navy Regulations, Chapter 20. (This includes Restricted and Technical Availabilities and Interim Overhauls).

5. Administer annual funds allocated for regular and interim overhauls, non-scheduled repairs, and supplies and equipage.

6. Prior to the commencement of the regular overhaul of a ship determine what repair items are to be accomplished and assign them a relative priority. (This is delegated to Type Commanders).

As discussed under responsibilities of CNO and the Material Bureaus, CINCLANTFLT and CINCPACFLT extend considerable effort and influence in the overall development and execution of the maintenance and modernization policies and programs within the Navy. They provide a major input toward the development of budget proposals. For example, a recent Type Commander's letter forwarding overhaul cost estimates for the forthcoming year starts out this way, "The overhaul cost estimates in enclosure (1) are postulated on the 'thorough overhaul' concept, critically considering the mission, anticipated operational life, known material condition, variations between types and within classes, and return costs of similar type ships over the preceding two year period."[16] The letter goes on to show a breakdown of estimated costs for each of his ships scheduled to enter an overhaul period during the budget year. Anticipated unusual costs must be enumerated and justified. This letter to CINCPACFLT was budgetary justification for CINCPACFLT to use in conference with CNO and BUSHIPS.

Board of Inspection and Survey Functions are established by OPNAV Instruction 4730.5A and U. S. Navy Regulations. Inspections are normally conducted by INSURV approximately six months before scheduled ship overhauls. The primary purpose of these inspections is to determine the vessels material readiness for war and for continued service. The deficiencies reported by INSURV should become the basis for shipyard work requests, if beyond forces afloat capability to rectify.

CHAPTER III

ADVANCE PREPARATIONS BY THE SHIP

Much has been said to the effect that preparations for the next overhaul commenced on the first day after the completion of the last overhaul. While there is truth in that statement, this discussion of advance preparations will start at a more realistic point approximately six months before the overhaul start date. Helpful documents most usually available before the overhaul work requests must leave the ship are the INSURV Report, the Bureau of Naval Weapons 150-day ORDALT Authorization Letter, The Bureau of Ships 120-day SHIPALT Authorization Letter, and your own current ship's maintenance program cards.

INSURV (Material) Inspection Report

Proper and thorough preparation for this inspection actually accomplishes a great deal of the preparation work for the shipyard overhaul. The basic references are the INSURV Instructions in the 4700 series and similar numbered instructions by Fleet and Type Commanders. The background data needed in order to prepare the Condition Cards for the INSURV Board should be found principally in the Machinery History cards or Current Ships Maintenance Program cards. If your ship has switched over to the Planned Maintenance System, use the Maintenance Requirement Cards. Additional sources are the file of Machinery Failure Reports, the Alteration and Improvement File and the ORDALT File of applicable but uncompleted alterations.

The results of the inspection will be a report of the material readiness condition of your ship, with particular emphasis on the outstanding deficiencies. Those items which are deemed to be beyond the capability of forces afloat to correct are candidates to be Work Requests for the forthcoming overhaul.

Review of the BUWEPS 150-day and BUSHIPS 120-day letters

As soon as these Alteration Authorization Letters arrive on board they should be reviewed for completeness as compared with your own alteration status file. While the Bureaus maintain accurate records of alterations completed (as reported by the shipyards and by the ships) occasional omissions or duplications occur. Note the paragraph on the ORDALT and SHIPALT authorization letters that calls for a report of discrepancies. See Figure 2. If these letters have not arrived on board prior to the date that the Overhaul Work Requests are due at the Squadron Office, ask your Squadron Engineer to show you the Fleet Improvement Plan (FIP) for the current fiscal year. See Figure 1. It will reflect the alterations expected to be on your 120-day letter.

Preparation of Work Lists

A. Shipyard Work List

While there is much that can be said in this area, it is generally accepted that the Type Commander's "Instructions on Preparation of Shipyard Work Requests" are readily available and well understood by all concerned. Thus only a few words of amplification will be made here.

The "routine items" or "recommended items" listed by the Type Commander should be carefully reviewed. Two major reasons for using the routines are: 1) they provide standard wording and coverage - this allows for easier investigation and cost estimating by the shipyard; 2) it provides greater assurance that certain items are not overlooked. Thoroughness and completeness of preparation of the shipyard work list will eliminate those delayed requests that later play havoc with a tight dollar budget and perhaps a very tight shipyard man-hour schedule.

B. Tender Work List

The men of the tender repair department are generally a very talented, capable and ingenious group of specialists.[17] Don't sell them short! Within the limits of equipment and time, there is little that tender repairmen cannot accomplish that a shipyard can do. Often their accomplishments within a specific time frame are superior to shipyards since working across trades is not a limitation. The completed repairs may not always look as "finished" or "pretty" as shipyard repairs, but within the shortest time they have completed the technical repair with skill, and the equipment can carry out its designed function. (And it didn't cost many out-of-pocket dollars from the limited type commander's funds.) As an aid to understanding tender organization and repair capability consult Figure 4. Notice that tender repair shops and functions are very parallel to shipyard organization. Visit the shops frequently and talk to your opposite number. It will be most revealing and profitable to both of you.

Whatever you can accomplish by tender work requests during regular upkeeps and during the pre-overhaul upkeep will save valuable dollars for other essential work that must be done by the shipyard. Each man-day (8 hours) of labor and minor work materials costs the Type Commander about $70 in a shipyard.

C. Ship's Force Work List

The common failure with these lists is not that they are incomplete, but rather that they contain more than the ship can accomplish during the overhaul. As the overhaul progresses, it frequently becomes apparent that some ship's force work must either remain undone or be transferred to shipyard for accomplishment. At this stage it may be too late for the shipyard to take on the added workload, or there may be insufficient funds available. In order to make your ship's force work list realistic, you as a department head must discuss with the Executive Officer or the Personnel Officer just what the prospects for manpower will be during the overhaul period. After the usual subtraction for school quotas, leave, transfers, etc., how many men will you have and what are their rates? Six Gunner's Mates and no Electrician's Mates doesn't offer too great a prospect for motor overhaul; third class Petty Officers are excellent watch standers and maintenancemen under proper supervision, but we can't expect a new third class Petty Officer alone to be a top calibre trouble-shooter and overhaul expert. Be ambitious but also be realistic!

Review of Work List by Squadron and Type Commanders

The usual time schedule for forwarding of the work lists is that they reach the Squadron three (3) months before overhaul start date,

to the Type Commander 2½ months, and at the shipyard no later than 2 months. Major attention in the review by the staffs is to insure completeness and standardness, and to bring the list within the funds budgeted. The latter is often the most difficult. As explained earlier, the Type and Fleet Commanders submit proposed budgets to BUSHIPS and CNO for the forthcoming year, for operation and maintenance of the Fleet. What actually is appropriated by Congress and allocated by the Secretary of the Navy is often times a great amount less than the best estimates prepared by the Commanders. As a result, the hard decisions of disapproving certain reasonable work requests must be made by the staff material officers. When the work requests, with Type Commander action endorsement included, reach the shipyard they are considered valid and official requests for performance of work.

Review Action by the Shipyard

A. Bureau Work

As soon as the BUWEPS 150-day letter and the BUSHIPS 120-day letter are received in the shipyard, the shipyard must expedite completion of all possible plans and design work before overhaul starts. Follow-up action is taken on late or delayed Bureau-furnished material for SHIPALTS and ORDALTS. Other known materials must be ordered to arrive in sufficient time to provide a reasonable assurance that the work can be completed.

b. Ship's Work Requests

Similar action must be taken as regards plans and materials for the ship's requested work. Particular attention must be paid to

the Title"D" Alterations requirements. An inspection of the ship and its equipment is usually made by the shipyard about 4 months before overhaul start. This provides for advance familiarity with ship's conditions and provides for more accurate estimation of cost and manpower needs. These inspections include an Electronics inspection, a Weapons System inspection and an overall Machinery and Hull inspection. The inspector should be apprised of any special conditions which exist which bear on approved alteration or repair work. The job planners and estimators must figure all costs associated with the job; this includes such items as interference removal and replacement, removal and reinstallation of equipment to be repaired or altered, costs of labor and material, tests, etc. Good estimates are essential to a meaningful arrival conference and the overhaul itself. The breakdown into cost components - direct labor, direct material, and overhead - will be discussed later under the Naval Industrial Fund section.

The result of successful planning is an early issue of job orders, availability of material on schedule, and proper coordination of scheduled manpower.[18] It is the shipyard's target to have approximately 85% of the jobs issued at the time the ship physically arrives in the yard for overhaul. The remaining job orders and auxiliary job orders come about as a result of the "open and inspect" requests, and other new work which comes about as conditions become apparent during the overhaul's progress. At this point it is important to recognize the difference between a work request and a job order. A work request, as the term suggests, is simply a request by the ship for the shipyard

to do some specific work. After the request has been investigated, appraised, and is acceptable to the shipyard within the time and money limits imposed, the Planning Department issues an order to accomplish the work - a specific assignment of the task, assigning shop responsibility, detailing materials, manhour limits and plans required. This is a job order. Learn the difference and use the proper term!

Cost Estimates

Cost estimates of requested work are entered on each request sheet that makes up the Work Booklet used at the Arrival Conference, and on each job order sheet. These estimates include those for direct material, direct labor manhours, overhaul costs, and total estimated costs. These estimates are made by experienced planners and estimators, and are based on information gained during the inspection of the ship, from the description of conditions on the work request, and average costs on recent similar jobs. This points out the value of well written work requests, especially if the ship will not be available for inspection by the planners and estimators before the arrival conference.

CHAPTER IV

OVERHAUL EXECUTION IN NAVAL SHIPYARDS

One of the most difficult times for a ship's company is the shipyard regular overhaul period. It is foreign to shipboard routine. It is a time of great upheaval from both material and personnel viewpoints.[19] The close-knit unity of shipboard life and its surrounding orderliness gives way to sudden change. The beauty of the mechanical efficiency is replaced by cold steel in apparent total disarray. Yet, despite all this, it is one of the most important and critical parts of a ship's life. The purpose of the shipyard in relation to overhaul is to make sure that this most important period is given fully toward maximizing the ship's return to peak readiness to carry out its mission.

Naval Shipyard Organization

The overhaul is a joint venture, with the ship's force and the shipyard personnel playing the leading roles. Perhaps no single item fosters a smoother flowing relationship between yard and ship than an understanding of the organization of the shipyard - being familiar with the billet alignment, functions, responsibilities, procedures, etc. Understanding this will provide a major link of communication in getting the job done. Figure 5 is a schematic outline of that part of shipyard organization with which you will be in frequent contact.

The shipyard organization is built around two major departments, Production and Planning.[20] The Planning Department translates the desired work of the customer into work orders (job orders) complete

with furnishing information and such engineering data and blue prints as may be necessary. Within the planning department there is a Type Desk for your ship. The Type Desk Officer (also called the Assistant Planning and Estimating Superintendent) and his civilian assistant (usually a GS-11 or 12) are the ship's contact for all planning department matters, scope of job orders, material ordering, and fund control. The Type Desk Officer will usually be the first officer contact that you have with the shipyard since he normally attends the pre-overhaul inspection, and chairmans the Arrival Conference. He is perhaps the most harried, pressured and over-worked official in the shipyard.

The Production Department performs the work. The work is done by various shops organized along trade lines (sheetmetal workers, electricians, welders, etc.). The work for your ship is coordinated by the Ship Superintendent. This officer (and his civilian assistant called a Progressman) are the ship's contact with the Production Department to progress work on the job orders and schedules, to follow up vital material on order, and arrange for dock and sea trials. His is a most difficult and involved position. He is invariably in the middle of every problem that arises for your ship; he is a tremendous source of information and a confident on your varied overhaul problems. Between the"Ship Supt" and the ship "Liaison Officer" (usually the ship's Engineering Officer is designated to be the ship's official Liaison Officer to the shipyard) will pass all work to be accomplished by the shipyard. Work with him closely - utilize him to the maximum benefit of the ship. Always keep him informed; deal through him in relationships with the shipyard workers.

A short paragraph here on the chain of command or "chain of seniority" within the Production Department appears to be in order. It is not very different from your own ship's organization. Perhaps you can pair off "equals" or "running mate" levels for communication purposes. Starting from the lowest seniority, the helper reports to the mechanic; the mechanic reports to the leadingman; the leadingman reports to the quarterman, who reports to the chief quarterman; the chief quarterman reports to the shop master, who is responsible to the Production Officer.

If you are receiving a Supply Overhaul you will be contacted by a third key officer, the SOAP Team Representative. This will be adequately covered in a later section of this paper, Supply Operations Assistance Program (SOAP).

Naval Shipyard Cost Procedures - Navy Industrial Fund

Title IV of the National Security Act Amendments of 1949 established the use of working funds at military installations.[21] The Navy Industrial Fund (NIF) is the working capital or "revolving fund" used by shipyards to accomplish its industrial functions. It provides a systematic means for operating the shipyard much as a private business corporation. Expenses must be balanced by income. The shipyard is a non-profit but self-sustaining enterprise. Budgets must be prepared and adhered to. As in private industry, divisions and shops are set up as "profit centers" for cost controlling purposes. They must not only accomplish the work in a satisfactory manner, they must do it within the financial limits of good business practices. Shops

are therefore competing against other shops to limit direct and indirect costs; shipyards are compared with other shipyards for dollar and man-day performance. The NIF accounting procedure is an excellent management tool to give the customer the best performance for the least dollars.

To understand the cost estimates on each job order sheet and on the final billing for work completed we should understand when and what specific charges are placed. Definition of terms follow.[22]

Direct Material Costs are the costs of materials directly associated with a specific customer order. This does not include general supplies and material used throughout the shipyard organization - - - they must be directly identifiable with the job order to which they are charged.

Direct Labor Costs are the man-hour costs directly identified with a specific job order. Its constraints are similar to the direct material charges above.

Indirect Costs or Overhead Costs are those costs associated with the operation of the shipyard but not identifiable as direct labor or direct material. Overhead Expenses are further broken down into Productive Overhead and General Overhead. The productive overhead is that expense incurred by the various shops and laboratories of the Production Department and the Design and Ordnance/Weapons Divisions of the Planning Department, in support of the production and planning efforts of those units, but not specifically identified with specific job orders. General Overhead expenses are those incurred by other

shops and departments of the shipyard in support of yard-wide service such as supply and disbursing, personnel and administration, security and fire protection, etc.

Excepted from NIF costs are such major costs as real estate and building costs, and major equipment costs.

Arrival Conference

If the location and operations of the ship permits, an Arrival Conference is held aboard the vessel approximately 2-3 weeks before the overhaul start date. If this is not possible, the conference is held as soon as the ship enters the overhauling yard. The advantage of the earlier conference is that it provides for early resolution of the approved work package so that about 85% of the job orders can be issued to the shops and ship by the time the ship arrives in the yard. Thus production work can commence immediately after overhaul start date.

The arrival conference is certainly the most important of all conferences and meetings held during the overhaul. It is here that the basic decisions are made, the work package is specifically defined and authorizations are formalized. The Commanding Officer, Department Heads, other supporting officers, and petty officers as desired should attend. The Type Commander's representative will be there and has authority to give final approval or disapproval of work. The conference will be chairmaned by the Type Desk Officer from the Shipyard. He is attended by key shipyard personnel of the Planning and the Production Departments, and usually the Ship Superintendent assigned to the ship. The conference takes from several hours to a day or more, depending on

the size of the work package, the degree of preparation for the overhaul, and the degree of limitation of funds.

Specific work cognizance must be resolved at this time. Nothing will lead to dissatisfaction and dispute between yard and ship more rapidly than failure to meet this commitment. Split cognizance of a job should be avoided whenever possible. If this is not possible, then an understanding of where the limits of the shipyard start and end must be established. This is especially true where the job involves a component of a system. For instance, if the shipyard repairs a computer range-rate controller it may or may not commit the yard to a final checkout of the full fire control system. Just what do you want? What is your understanding of the commitment? The last few days of the overhaul is a poor time to settle this type of problem.

Other Conferences

In addition to the all-important "Arrival Conference" there are others of importance occurring at frequent intervals. A Scheduling Conference is held, usually within the first week, to schedule the orderly flow of work and material on each job, to eliminate conflict of certain events and omission of others, and to establish key milestones during the overhaul period.

The Shipyard Commander's Conference is held weekly. It is attended by the Shipyard Commander and his senior assistants (usually the Planning Officer, Production Officer and Administrative Officer) and each ship's Commanding Officer. General overhaul progress and "pressing problems" are discussed.

Also weekly, the Production Officer's Conference is held. A ship's officer thoroughly familiar with the overhaul status (usually the Engineer), should attend each meeting. Detailed problems in the production area are introduced, discussed, and action started toward solution.

There are other important conferences throughout the overhaul. Attend and stay informed!

Progress during the Overhaul

As soon as the arrival conference is over and the ship is in the yard you are involved with expediting the execution of many facets of the overhaul. The Scheduling Conference maps out the course of action. One of the essentials to knowing just where your state of progress is, is having a workable and up-to-date system of Progress Charts. There are many ways and methods of graphing; pick the one that works best for your ship and use it. The success of the progress chart lies in accurate and timely posting of information. Keep at it; if you need help on setting up a good system, ask the shipyard for help. They are experts at this game.

Keep pushing for all jobs to get started; then keep pushing for their completion. The Type Desk Officer and Ship Superintendent have carefully laid out a timed schedule for each job. You've most likely helped them make it up. Try to stay ahead of the schedule, especially early in the overhaul. The inevitable slippage creeps in during the later phases of the overhaul.

Sign off your jobs as soon as you can, but don't sign them off until you know that you have the job done properly. Here are several reasons for early sign-off:

1. The more jobs signed off, the less you have to continue monitoring.
2. Spreading the completion and inspection over a greater portion of the overhaul period, not just the last few weeks, allows for a better, more thorough inspection and check-out.
3. Specific job completions allow others to start - - - reinstalling the repaired pump allows for installation of all the interferences, and leads toward completion of associated or interrelated jobs.
4. Early completion allows for longer test and proof-running of repaired equipment. A few minutes of motor operation doesn't mean much. Run it for longer periods resembling at-sea operation, if possible.

As new job orders are issued, be sure that the responsible ship's personnel get copies. One master file should be maintained in addition to the department file. Read the job order - be sure it says what you thought you requested be done. If it doesn't, see your Type Desk Officer about it. Additional job orders continue through the first half of the overhaul period as a result of the "open and inspect" job orders. "Auxiliary" job orders are issued to amplify a basic job order because of necessary increased scope of work involved.

But don't be concerned only with the progress of the flow of paper. Follow the work in the shops and aboard the ship. Stay on top of it. Why are we slipping behind? Delayed material? Shortage of workmen? Interference? or what? Don't pass your problem on to the worker. If you're not satisfied with progress, address your problem to the Ship Superintendent or Type Desk Officer. Push, but don't get over-bearing; remember that the shipyard workers are on your side, if you want them to be. Establish good working relations.

Frequent trips should be made to the shops where the ship-to-shop work is being done. Follow up the progress. What was wrong with the equipment? What was the most likely cause? What preventative maintenance act could have prevented it? Here is an excellent opportunity for training and education of ship's personnel. Observation of shop work provides an excellent personal contact between yard and ship's personnel on a business basis.

Inspection of Work

The overall guidance for inspection work is quoted from Article 2047 of U. S. Navy Regulations:

> 1. The inspection of work being done by a repair activity for a ship shall be the responsibility of the commanding officers of both the repair activity and of the ship. The commanding officer of the repair activity shall require such inspections to be made as will ensure the proper execution of the work and adherence to prescribed specifications and methods. The commanding officer of the ship shall make such inspections as may be necessary to determine if the work is satisfactory, both during its progress and when completed, and to this end shall appoint such additional ship's inspectors as may be necessary to assist and represent him. For a ship not in commission the naval commander to whom the ship is assigned, or his designated representative, shall perform the inspections prescribed herein.

2. The commanding officer of the ship and his assistants shall confer frequently with appropriate officials of the repair activity as to the work being undertaken.

Your Type Commander has more specific instructions on inspection requirements.

The naval shipyard (or the Industrial Manager if you are in a private shipyard) is responsible for the revision of all ship's plans and allowance lists so that they will accurately reflect all work performed during the overhaul period.[23] In many cases, of course, it will be impossible to revise such plans until well into the overhaul period. This is particularly true in the case of revision to the Ship's Allowance Lists. For example, a specific model of an item of equipment ordered by the Navy or the contractor for installation on the ship may be out of stock or otherwise unavailable. In such cases, a substitute item of equipment with similar characteristics will normally be provided. However, since the nature and quantity of repair parts required by the substituted item may vary extensively from the original one, it may not be possible to finally revise the allowance list of repair parts, which the ship is authorized to stock, until the substitute equipment is received in the contractor's yard.

The Design Division is responsible for determining whether each work item in the job order specifications will require revision of the ship's plans and allowance lists. Normally, revision to the ship's plans will result primarily from work required by SHIPALTS or ORDALTS. However, revisions to allowance lists can also result from ship repairs

when substitution of uneconomically repairable items of equipment is involved.

There are three major categories of plans and other publications maintained by the ship which must be revised as necessary during the overhaul period. They are known collectively as "Selected Records" and include: 1) Selected Record Plans, 2) Selected Record Data (includes the Ship's Plan Index, general information books and damage control books), and 3) Allowance Lists. More detailed information regarding the revision of Selected Record Plans and Selected Record Data is contained in the current BUSHIPS Instruction 4720.6 entitled "Design Work Responsibilities for Ship Alterations and Assignment of Planning Yards."

Selected Record Plans

An extensive collection of detailed plans for each Navy Ship, including all major plans used in its construction, is maintained by the cognizant Planning Yard. A limited number of these plans, referred to as "Selected Record Plans," are selected for inclusion on board the ship.

A. For surface ships these include:

1. The Docking Plan, containing the configuration of the ship's hull and other information to be used in docking and undocking of the ship. This plan must be revised as necessary after each dry docking of the ship.

2. The Booklet of General Plans, containing basic plans of each deck and the superstructure of the ship. Changes to the ship's rigging, for example, may require alteration to these plans.

3. Plan of Running, Signal, and Anchor Lights Location.

4. Schedules of Watertight Integrity Tests and Inspections (not required for service craft).

5. Tank Capacity and Curves of Vertical Center of Gravity.

B. In the case of submarines, these plans include:

1. - 3. as above.

4. Compartment and Tanks - Testing Requirements.

5. Moment Diagram

6. Lead Ballast Stowage

7. Salvage System Arrangement

8. Escape and Rescue Arrangement

9. Tank Capacity Curves, Curves of Center of Gravity, and Curves of Moment of Inertia

Selected Record Data

A. Ships Plan Index. The SPI is a comprehensive list of all available plans and related design reference information applicable to a specific ship. Only the Selected Record Plans described above, of course, will be available on board the ship. The large majority of these plans, including the original construction plans, will be available only from the cognizant planning yard. SPI's list all hull, machinery, electrical, and electronic plans applicable to the ship by:

1) Title, 2) Bureau plan number and revision number, and 3) Design contractor's plan number.

B. Damage Control Books contain information and instructions concerning the ship's damage control system. For example, typical Damage Control Books include plans and information concerning the maintenance of watertight integrity, fire precautions and fire fighting, drainage of damage water, magazine sprinkling equipment, and communications systems for the specific ship. The book contains instructions for correcting its diagrams and text. These corrections should be completed before leaving the yard.

C. Other Information Books. In addition to the SPI and the Damage Control Book discussed above, other publications containing information applicable to the specific ship are also classified as Selected Record Data. For example, the General Information Book, containing miscellaneous information necessary to the operation of the ship, the Piping Instruction Book, the Record of Electrical Installations, and the General Description of Electronics Systems Installations fall in this category. For newly constructed ships, the Ship Information Book takes the place of these publications. It normally consists of six volumes:

Vol. 1 Hull and Mechanical

Vol. 2 Piping, Ventilation, Heating and Air Conditioning Systems

Vol. 3 Power and Lighting Systems

Vol. 4 Electronic Systems

Vol. 5 Interior Communication and Fire Control Systems

Vol. 6 Instrumentation

Allowance Lists

A. The final category of Selected Record Data consists of the ship's allowance lists. Ships are currently provided with a Coordinated Shipboard Allowance List (COSAL) which lists 1) all installed equipment and equipage on board the ship and 2) authorized stockage quantities of repair parts for support of this equipment. The COSAL is divided into a number of segments which include information on the following:

1. Hull, mechanical and electrical equipment (BUSHIPS contribution)
2. Electronic Equipment
3. Electronic repair parts
4. Ordnance equipment
5. Equipment contributions from other Bureaus

B. A Stock Number Sequence List (SNSL) is provided in the COSAL for all repair parts and consumable supplies, in stock number order, required for the support of all equipment listed in the COSAL.

C. Correction of the allowance lists will be covered in a later chapter of this paper called "Supply Overhaul."

Assist Ship's Force Work

Usually one overall work request is submitted and approved by the Type Commander for shipyard assistance to the ship's force on specific minor jobs as necessary. There is a fixed dollar upper limit assigned to this job. One officer, usually the ship's Engineer, monitors and controls this work by specific item request from other

officers. Within established funds and time limits the shipyard accepts these requests without further question. The Ship's Superintendent will be a source of valuable assistance in this area.

Cumshaw!

Earlier we discussed labor costs under direct labor costs and overhead costs. Each man-hour is charged against either a specific job order or against shop overhead. The shipyard worker is paid a fair wage for his efforts. There is no need for "tipping"; there should be no need for passing out coffee, hams, etc., to get favorable treatment. The scheduled work will get done, and you will pay for it by the job order cost. Pass out "tips", and you pay for it a second time! The shipyard officers are the strongest supporters of "No Cumshaw!"

Ship's Force Work

A minimum will be said here about own ship's force work. That is an area wherein you are familiar. There are, however, several small bits of worthwhile information to pass on. 1) Those portions of ship's force jobs which require assistance such as machining of parts, dipping an armature, rigger service, etc., can be obtained by use of the Assist Ship's Force Job Order. 2) Don't neglect the equipment which is not scheduled for overhaul. It won't rest in a cold steel hull for several months amid the dust and dirt of an overhaul and then start up again as soon as you flip the start switch. You've heard this before: - "I don't understand, it was working when we came in here four months ago!"

Record Keeping

All maintenance work accomplished during overhaul should be entered in the Machinery History Cards, following the same criteria as at sea. You are writing the history of the equipment and the effectiveness of the maintenance accomplished. The shipyard will give you the "maintenance data" as part of each job order. If it isn't furnished in a timely manner, make it the subject of a discussion with the Ship Superintendent.

All ORDALTS completed should be reported to BUWEPS within 10 days after completion of overhaul, using BUWEPS Ordnance Inventory/ORDALT Status Listing report form.

All SHIPALTS completed should be reported to BUSHIPS by executing the PINK copy of the SHIPALT.

Dockside Trials and At-Sea Trials

These periods of proof-running and check-out of completed installations and repairs, and the satisfactory functioning of the ship as a whole, are specifically covered by Type Commander Instructions and Shipyard Instructions. Since they have specific and detailed meanings for individual ship types, no further comment will be made in this paper.

Ready for Sea (RFS) Period

A. The Readiness for Sea (RFS) period is an allotment of time immediately following the overhaul period which the cognizant Type Commander generally allots to active fleet ships for additional preparations prior to active sea duty. The time may be used, for example,

to load ammunition and supplies, for special sea exercises and maneuvers, or to prepare for special missions. The RFS period allotted to a ship will not normally exceed seven days and will frequently be less. In cases where there is an immediate operational need for the ship, it may even be omitted entirely.

B. If a ship has been assigned an RFS period immediately following overhaul, neither the shipyard nor the INDMAN is permitted to use this period for the accomplishment of work items which the yard has been unable to complete by the scheduled delivery date. Rather, in such cases the shipyard or INDMAN should attempt to obtain an extension of the availability period from the cognizant Type Commander.

CHAPTER V

OVERHAUL EXECUTION IN PRIVATE SHIPYARDS

Article 2046 of U. S. Navy Regulations states "Repairs and alterations to naval ships normally shall be accomplished by naval activities or by commercial yards under contract to the Navy." Of recent years the ratio of work assigned to naval versus commercial shipyards has been established by Presidential Executive Order, or by a statement in the Annual Appropriation Bill passed by Congress. Presently the policy is 40:60, which is interpreted as "no less than 40% of the total naval ship repair will be assigned to commercial yards."

The procedures employed in the preparation for and execution of an overhaul in a commercial or "private" yard are quite different from those for a naval shipyard. The principal reason is this: An overhaul in a naval shipyard is entered into with a rather semi-formal agreement between two naval activities for the complete overhaul of the ship and equipment in accordance with shipyard estimates of the cost involved; an overhaul in a private yard is a formal, binding agreement for specific work items to be accomplished in accordance with established specifications, plans, etc., for a specific contract price. In a recent personal letter from a large commercial shipyard the difference was spelled out this way. "As a general comment, the basic difference between a Private yard and a Navy yard is that the former is operated for a profit, utilizing the least number of people sufficiently skilled to be productively efficient in a very competitive

market." In order to most efficiently and effectively enter into and execute the overhaul contract with a private yard, a Navy activity called the Office of the Industrial Manager is employed. A brief description of this activity is considered vital to the understanding of the relationship between the contractor (private yard) and the customer (the ship and the Type Commander).

Office of the Industrial Manager

The Ship Repair Contracting Manual[24] fully explains the organization, the purpose and the functioning of the Industrial Manager (INDMAN). It is a ready reference to the statutory regulations, procedures, policies, and principles which condition and/or affect the procurement, administration and performance of repair and overhaul services under the overhaul contract (termed the Master Ship Repair (MSR) Contract). It should be read and referred to by every ship's officer before and during his preparations for ship overhaul. The following pages will briefly set forth the principal facts deemed necessary to understanding the procedures for entering and completing a ship overhaul in a private yard.

An office of the Industrial Manager is established in each Naval District. It operates under the management control of the Bureau of Ships and under the military command of the District Commandant. The Commander of a Naval Shipyard within the Naval District is usually the INDMAN, and the shipyard Planning Officer (or some other specifically designated officer) acts as the administrative head of the INDMAN organization. A standard organization of the INDMAN is shown on

Figure 6. Usually there is more than one port area per Naval District wherein ship repair activity is located. To cover each of these areas, Assistant Industrial Managers (ASTINDMANS) are established with staffing and responsibilities parallel to the INDMAN. Although the organization itself it self explanatory, it is considered important to briefly indicate the area of responsibility of certain officers with which you will have frequent contact.

Ship Repair Department

This department provides planning, design and inspection services for all ship repair work performed under INDMAN cognizance, including hull, machinery, electrical, electronics, weapons, degaussing and salvage. This actually is the work normally performed by the Planning Department of a Naval Shipyard and relieves the contractor of this great workload and responsibility. This area accounts for some of the difference between costs in a private yard and a Naval Yard, in that the above costs are borne by the INDMAN

Weapons Officer

This officer acts as the advisor on all Bureau of Naval Weapons matters and exercises technical control over the conduct of all weapons work for which the INDMAN is responsible, including the design, installation, inspection, repair and final testing of ordnance equipment. This is similar to the service provided by the Combat Weapons System Superintendent in a Naval Shipyard.

Contract and Materials Department

This department is responsible for the award and administration of all Master Ship Repair Contracts, and job orders thereunder, for repair and overhaul work. This responsibility includes all contractual, accounting and financial matters relating to INDMAN procurements. This is a vast area of effort normally accomplished in a Naval Shipyard within the Supply Department. Close liaison between the Ship Repair Department, Contract and Materials Department and the Contractor is required. °

What the above listing of duties performed by the INDMAN should point out to the reader is this: When a ship enters a private yard for overhaul, what that yard is essentially producing is the actual production repair and overhaul work normally accomplished by the Production Department of a Naval Shipyard. Most of the planning, scheduling, supply and design functions are performed by an intermediary participating force - the Industrial Manager's Organization.

Commercial (Private) Shipyard Organization

Private shipyard organizations vary in size and structure depending on whether they are primarily a ship building yard or a ship repair yard, and the overall size of the firm.[25] They vary in size from the giants of the industry such as TODD Shipyard Corporation with major shipyard facilities in eight of the large U. S. seaports, to the "bicycle shop" ship repair activity whose organization is in the back pocket of the owner who subcontracts out all the contracted

overhaul work. Figures 7 and 8 show typical organizations for a shipbuilding yard and a ship repair yard.[26]

As a result of this great variation in yard organization this author will not devote space to a discussion of it. As soon as you learn the name and location of the yard to which your ship has been contracted for overhaul, it is recommended that you request pertinent literature from either the yard or from the District INDMAN.

Sequential Proceedings for Preparation for Overhaul in a Commercial (Private) Shipyard

As outlined in an earlier chapter, the Bureau of Ships, in conjunction with the Fleet Commanders-in-Chief, prepares and submits to CNO an annual overhaul schedule. CNO, after conference with the Fleet Commanders-in-Chief, publishes and distributes the official overhaul schedule of ships. Among other information in this schedule is the designation as to whether each ship will overhaul in a naval or private yard. The INDMAN for the area to which a ship is designated for private shipyard overhaul is responsible for the scheduling and execution of those overhauls.

INDMAN receives copies of the BUWEPS 150-day letter of Ordnance Alterations and the BUSHIPS 120-day letter of Ship Alterations, designating the brueau-planned work for each overhaul.[27] He receives advance copies of the ship's work requests about 90 days before the overhaul and the Type Commander's screened copy of these work requests about 60 days prior to the scheduled overhaul date. Armed with this information the INDMAN proceeds with making ready all details for the contracting and execution of the overhaul. As soon as he receives

the advance copy of the work requests, INDMAN conducts an inspection of the ship for purposes of viewing the ship and the work requested. He uses this information to prepare Specifications for all the overhaul work and to make estimates of the cost for the work. INDMAN sends the detailed specifications for the full work package to a list of prospective bidders. These procedures are in accordance with Armed Services Procurement Regulations (ASPR) and Naval Procurement Directives (NPD).

The bidders usually conduct an inspection of the ship, contact potential suppliers and subcontractors to obtain prices for supplies and the work which is to be subcontracted, prepare detailed cost estimates for the specified work and submit their sealed bids to the INDMAN office. All the bids are opened on the designated Bid Opening Date and the contract for the overhaul is awarded. Current CNO instructions require that the bid opening, contract award and notification to the ship of the yard selected must be at least two weeks before overhaul starting date.

Before going into the yard execution procedure, it is considered appropriate to indicate some cautionary remarks toward preparation of the work requests. The ship's force preparation of the work requests must be clear, comprehensive, and accurate in order to assure a successful overhaul. You will get what you ask for: ask too little and it will not appear in the contractor's estimate and thus will not be done; ask for too much and you waste unnecessary funds and labor hours. With regards to the review of the BUWEPS 150-day letter, it

is important that within 2 weeks of receipt of this letter that you verify if any of the indicated alterations have been completed, and to indicate whether any of the ORDALT kits are on board. Similar review action is indicated for the BUSHIPS 120-day letter. If these letters are not accurate, the shortcomings will appear in the work specifications prepared by INDMAN. The Contractor is in a very competitive business, trying to make a profit on his investment of time, money, labor and equipment. A successful overhaul means success to both parties - contractor and customer. Both parties should have the same interpretation of the overhaul work package.

In the earlier discussion of naval shipyard key contact officers, we indicated that the Type Desk Officer was the primary liaison officer for the Planning Department, and the Ship's Superintendent was the Production Department representative. During the private yard overhaul, the members of the INDMAN staff replace the Type Desk Officer. Also, a specifically designated INDMAN officer is named "The Ship Surveyor" to accomplish the Ship's Superintendent duties of evaluating work progress, the administration of Government-furnished material and equipment and inspection of the completed jobs.

As in naval shipyards, an Arrival Conference and a Scheduling Conference are held to get the business at hand well organized and clearly understood by contractor and customer. With regard to the evaluation of work progress and inspection of completed work, although the INDMAN has accepted responsibility for monitoring this area, the ship's Commanding Officer is responsible to satisfy himself that the

work is performed in a satisfactory manner and in accordance with the contract terms. Review Article 2047 of U. S. Navy Regulations. The ship's inspectors, contract representative, and the Ship Surveyor are all required to inspect and approve work completion as being satisfactory. Detailed familiarity with the requirements of BUSHIPS Technical Manual and Chapter 7 of U. S. Navy Regulations is recommended.

Conduct of Dock Trials and Sea Trials and the completion of overhaul routines are similar to those outlined under Naval Shipyard overhaul procedures.

CHAPTER VI

SUPPLY OVERHAUL

Supply Operations Assistance Program (SOAP)

Not many years ago the maintenance of an adequate stock of spares for the rather simple equipments aboard ship was not too difficult a task. However, the advent of modern electronics equipments, nuclear propulsion and intricate weapons systems aboard the modern vessel has created a problem of tremendous proportion. Literally hundreds of thousands of specific, non-interchangeable parts and components now make up a single ship's vital allowance. To assure completeness and accuracy of this list and to promote material readiness it has become just as vital to completely overhaul the shipboard spare parts supply at regular time intervals as it is to overhaul the ship itself. Accordingly, during the 1950's the Supply Operations Assistance Program (SOAP) was born. It is now an integral part of each shipyard overhaul.[28] After nearly a decade of SOAP the Service Force Commanders are confident that the dollars spent on this type of supply overhaul provide more readiness for the dollar than the OPTAR dollar does. There is really no other acceptable method of proper integration of repair parts to support the new equipments being installed during the overhaul period.

Objectives of Supply Overhaul[29]

The primary objective of a supply overhaul is to bring the ship's records and on board repair parts into agreement with the new allowance list, whether it be Coordinated Shipboard Allowance List (COSAL)

or Tender Load List. This objective implies many preliminary and related objectives as follows:

A. Insure that equipment indices and allowance lists accurately reflect the equipment to be supported at the termination of the shipyard overhaul. This requires a full integration and consolidation of the new equipments' parts with the pre-overhaul allowance list, minus equipments being removed during the overhaul.

B. Off-load, identify and inventory the complete stock of technical repair parts on board at the time of commencing overhaul.

C. Purge the stock of all parts no longer required by the new allowance lists.

D. Inspect the material and insure its readiness for issue. Repackage, tag and represerve,as necessary, the parts for stowage.

E. Verify equipment changes initiated during the shipyard overhaul and take appropriate repair part support action necessitated thereby.

F. Collect usage data on, and research for application, those on board repair parts that do not appear as allowed items on the Inventory Control Point (ICP) allowance list.

G. Establish stock records which will accurately reflect quantities on hand and location of material

H. Develop a document of recommended stock quantities that, in addition to reflecting the applicable repair parts appearing on the Stock Number Sequence List (SNSL), will also incorporate the following:

a. Cognizance symbol and stock number changes

b. Repair part changes necessitated by equipment changes and corrections to the COSAL.

c. Repair parts that have a known application and those that have had a recorded usage, even though they do not appear as allowed items in the COSAL

I. Determine valid excesses of repair parts to be off-loaded and valid deficiencies to be requisitioned, as funds permit.

J. Ensure that upon release from the supply overhaul, all technical repair parts are restowed on board in such condition as to ensure maximum readiness. Plan and adjust storage space for maximum usage.

K. Train ship 's personnel in the use of supply overhaul aids and in the maintenance of inventory control records, to sustain optimum material readiness subsequent to supply overhaul.

Responsibilities

A. Type Commander

1. Determine the ships in need of a supply overhaul
2. Assign ships to a supply overhaul
3. Accomplish allowance list validation briefing for ships prior to commencement of shipboard validation
4. Coordinate the scheduling of the preliminary arrival briefing
5. Collaborate with the SOAP Team in accomplishing the supply overhaul
6. Finance deficiencies, as funds permit

B. Ship

1. Validate allowance lists prior to start of supply overhaul
2. Provide personnel for supply overhaul processing effort
3. Assisted by SOAP Team:
   a. Identify and inventory material
   b. Update stock numbers
   c. Record usage data
   d. Update records and allowance lists. Accomplish supply overhaul as directed by Type Commander and SOAP Team

C. Shore Support and Alteration Activity - Shipyard

1. Provide warehouse space, facilities and materials handling equipment
2. Provide technical reference material
3. Provide packing and preservation services
4. Provide civilian technical assistance
5. Notify SOAP Team of any hull, mechanical and electrical changes made during the maintenance overhaul. Provide SOAP Teams with interim Allowance Parts Lists (APLs) or Allowance List Appendix pages for new equipments installed incident to the overhaul, and for equipments previously installed but omitted from the COSAL.
6. Provide SOAP Teams with the Summary List of Component Changes for hull, mechanical and electrical equipments upon completion of the maintenance overhaul.

7. Notify SOAP Teams of any electronic equipment changes to the ESO COSAL Index

8. Provide SOAP Teams with APLs for mobile equipments

D. SOAP Team

1. Provide procedures, guidance, liaison, supervision, coordination and progress reports during the supply overhaul

2. Arrange for data processing services

3. Provide necessary supply aids and instruct the ship as to their proper use

E. Allowance List Maintenance Activities - SPCC, ESO, OSO and Other Inventory Control Points

1. Provide validation aids

2. Provide updated allowance lists, as appropriate, reflecting equipment changes

3. Provide electric accounting machine cards for use during the supply overhaul

General Information

Type Commanders should coordinate the scheduling of a preliminary arrival briefing conference, approximately 30 days prior to commencement of the overhaul. Both the Type Commander and SOAP Team representative will attend the preliminary arrival briefing. The purpose of the briefing is to accomplish the following:

A. Advise the Commanding Officer, Department Heads, Supply Officer and key enlisted personnel as to the objectives of the supply overhaul and the responsibilities of the various activities concerned

with the supply overhaul.

B. Advise the ship of the number and rates of personnel required for the ship's "T" Division. Emphasis as to the caliber of personnel assigned is stressed since the success of a supply overhaul will be in direct relation to the ability and motivation of personnel assigned.

C. Reach an agreement with the command as to the scheduling of events, including the date and place of off-loading of repair parts, arrangement for crane services, etc. To attain the objectives of a supply overhaul, it is normally necessary to off-load all repair parts, with the possible exception of bulkhead-mounted items, to a designated area ashore for processing.

Classes of Parts Items in the Allowance List

1. Store Room Items (SRI) will be completely put through SOAP procedure.
2. Operating Spare Items (OSI) will not be processed by the SOAP team.
3. Consumables, for ships with central storerooms, will be processed only to the extent of collecting usage data and developing new Stock Record Cards Afloat and Afloat Locator Inventory Records.

Because the detailed procedures for conducting the supply overhaul are currently in a status of revision and consolidation the author requests the reader to refer to the most currently effective issue of the Service Force Commander's SOAP procedures for specific instructions.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The preceding pages have outlined the sequence of events that make up the overall picture of the shipyard overhaul of a ship. It is the author's belief that this paper will give a clearer and more purposeful outline of the many facets of this most important phase in a ship's life. The coverage and details are by no means complete; to do so would require too bulky a manuscript to meet the simple purpose of this paper. The alert and motivated officer will read and digest further the many reference materials on this subject.

The planning and executing of a single multi-million dollar ship overhaul provides one of the greatest challenges of a naval officer's career. For this most important task it is vital that each one of us involved take on the perspective of a true manager. Planning is the starting point in the management of any function. The necessary steps from CNO and Bureau responsibilities, through the Fleet Commanders-in-Chief, the overhauling yards, and finally at the ship level, have been spelled out. The objectives in improved maintenance management must always be toward maximizing ship readiness through efficiently spent dollars and man-hours.

Failure to fully understand your shipmates and working associates is a failure in communication. This breakdown in common understanding of the problem can often be traced to not knowing the other fellow's functional responsibilities and his position in the organization for

which he performs. Toward this goal the functional organization of the Naval Shipyard, the Tender Repair Department, the Industrial Manager's Office and the Commercial Shipyard have been set forth.

Coordination of the many facets of ship overhauls requires a full knowledge of the sequence of meaningful events from start to finish. Additional attention to the cited references will give a thorough background in overhaul matters.

Control of funds, facilities and manpower is made possible by aggressive follow-through on each job order, each inspection of work progress and each proof-testing of the finished product. Continuous evaluation of feedback on work progress will point out better ways of direction toward the final objective. An effectively managed overhaul will give your ship a maximum material readiness to carry out its assigned mission in the many months that follow.

P R	CATEGORY FUNCTION	SHIP TYPE	SHIP NUM	ALTERATION BRIEF	SHIP CLASS	ALT PREF	ALT NUM	% P	MATERIAL F	S	W	N	MAN DAYS	SIG NUM	YARD INMAN	START DATE	TYPE AVAIL	T D	DOLLAR VALUE
2	4CC401	DE	1030	WINCH, SNAKING	1021		118			S					BSN	1-15-64	REG	3	
2	4CC401	DE	1030	FILTER JP-5	1021		118			S				242A	BSN	1-15-64	REG	3	
1	065000	DE	1030	MCD AUTO DEGAUSSING EQ-SM-9	1021		122			S			32		BSN	1-15-64	REG	3	
1	065001	DE	1030	1 MCD KIT AUTO DEG SM-9	1021		122			S					BSN	1-15-64	REG	3	
1	019000	DE	1030	INSTL MOIST SEP/OIL REM H.P. AIR	1021		128						30		BSN	1-15-64	REG	3	
1	12400M	DE	1030	PP 388A/U POWER SUPPLY	1021		134		F						BSN	1-15-64	REG	3	
1	124000	DE	1030	PWR SUP PORT MK 44 TORP PRESET	1021		134		F				25		BSN	1-15-64	REG	3	
1	23700	DE	1030	PNL, DEGAUSSING GRD DETECT.,PROV	1021		136			S			25		BSN	1-15-64	REG	3	
													15,262 •						
2	4CC11	DE	1034	VDS&HCIST-1AN/SQA-10	1033		X001		F				4300	280	CHASN	4-30-64	REG	3	
2	6C101	DE	1034	ENLARGE PILOT HOUSE	1033		10						135	23A	CHASN	4-30-64	REG	3	
1	019000	DE	1034	INSTL MOIST SEP/OIL REM H.P. AIR	1033		27						30		CHASN	4-30-64	REG	3	
1	12400M	DE	1034	PP 388A/U POWER SUPPLY	1033		34		F						CHASN	4-30-64	REG	3	
1	124000	DE	1034	PWR SUP PORT MK 44 TORP PRESET	1033		34		F				25	•	CHASN	4-30-64	REG	3	
2	17C10	DE	1034	LCRAN CONVERTER MK-637/UPN-15	1033		40		F				40	311C	CHASN	4-30-64	REG	3	
1	117000	DE	1034	RELOC AN/SPS-5 TRANSMIT REC	1033		45						50		CHASN	4-30-64	REG	3	
2	4CC40	DE	1034	DASH CONTROL FAC, PARTIAL	1033		50			S	W		450	242	CHASN	4-30-64	REG	3	
2	4CC401	DE	1034	TABLE PLOTTING NC-2	1033		50			S				242	CHASN	4-30-64	REG	3	
2	4CC401	DE	1034	AMP, SYNCHRO SIG	1033		50			S					CHASN	4-30-64	REG	3	
													5,030 •						
2	4CC11	DE	1035	VDS&HCIST-1AN/SQA-10	1033		XC01•		F				4300	280	I 11	1-31-64	REG	3	
2	6C101	DE	1035	ENLARGE PILOT HOUSE	1033		10						135	23A	I 11	1-31-64	REG	3	
1	019000	DE	1035	INSTL MOIST SEP/OIL REM H.P. AIR	1033		27						30		I 11	1-31-64	REG	3	
1	079000	DE	1035	RELOC REMOTE SLUICE VAL CONT ROD	1033		32						75		I 11	1-31-64	REG	3	
1	12400M	DE	1035	PP 388A/U POWER SUPPLY	1033		34•		F						I 11	1-31-64	REG	3	
1	124000	DE	1035	PWR SUP PORT MK 44 TORP PRESET	1033		34		F				25		I 11	1-31-64	REG	3	
1	124000	DE	1035	WK INCDT BUWEP GFCS MK 70 FS 38	1033		35						10		I 11	1-31-64	REG	3	
2	17C10	DE	1035	LCRAN CONVERTER MK-637/UPN-15	1033		40		F				40	311C	I 11	1-31-64	REG	3	
2	4CC40	DE	1035	DASH CONTROL FAC, PARTIAL	1033		50•			S	W		450	242	I 11	1-31-64	REG	3	
2	4CC401	DE	1035	TABLE PLOTTING NC-2	1033		50			S					I 11	1-31-64	REG	3	
2	4CC401	DE	1035	AMP, SYNCHRO SIG	1033		50			S				242	I 11	1-31-64	REG	3	
													5,065 •						
2	4CC32	DER	251	MK 32 TORPEDO TUBES	386		453				W		250	247	I 01	4-06-64	REG	3	
1	121000	DER	251	BLSHIP WRK INCIDNT ORDALT 3760	386		477						5		I 01	4-06-64	REG	3	
1	121000	DER	251	BLSHIPS WRK INCIDNT ORDALT 3095	386		478						10		I 01	4-06-64	REG	3	
2	17C10	DER	251	LCRAN C LR NAVIG SYS AN/UPN-12	386		483		F				30	311B	I 01	4-06-64	REG	3	
2	17C10A	DER	251	LCRAN MK 637/UPN-15	386		483		F				30	311B	I 01	4-06-64	REG	3	
1	019000	DER	251	INSTL MOIST SEP/OIL REM H.P. AIR	386		497						30		I 01	4-06-64	REG	3	
1	12400M	DER	251	PP 388A/U POWER SUPPLY	386		501		F						I 01	4-06-64	REG	3	
1	124000	DER	251	PWR SUP PORT MK 44 TORP PRESET	386		501		F				25		I 01	4-06-64	REG	3	
1	C12000	DER	251	STIFFENING IN WAY OF SEA CHESTS	386		502						108		I 01	4-06-64	REG	3	
1	124000	DER	251	VIDEO INTEGRATOR FOR AN/SPS-8	386		510		F				15		I 01	4-06-64	REG	3	
													503 •						
2	4CC32	DER	334	MK 32 TORPEDO TUBES	386		453				W		250	247	I 12	5-14-64	REG	3	

FLEET IMPROVEMENT PLAN FOR FY 1964

Figure 1

62

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
SS478
Ser 525-1961
31 AUGUST 1962

From: Chief, Bureau of Ships
To: Commander, Norfolk Naval Shipyard
Commander, Mare Island Naval Shipyard
Deputy Commander Submarine Force, U. S. Atlantic Fleet
Commanding Officer, USS CUTLASS (SS478)
Chief, Bureau of Naval Weapons

Subj: USS CUTLASS (SS478); 120 day letter for authorized alterations

Ref: (a) BUSHIPS INSTR 4720.3 of 29 Dec 1954
(b) BUSHIPS INSTR 4700.1A of 30 Dec 1959
(c) BUSHIPS INSTR 4720.5A of 14 Apr 1960
(d) BUSHIPS INSTR 4720.6B of 15 Apr 1960

Encl: (1) List of authorized alterations for USS CUTLASS

1. Authorization. CUTLASS is scheduled to be overhauled at Norfolk Naval Shipyard from 14 January 1963 to 24 May 1963. The alterations in enclosure (1) are authorized for accomplishment during this availability.
2. Estimate. The Bureau's estimate of the authorized alterations is $375,000. A planning estimate of that amount will be established 1 October 1962.
3. Reports. Reports required by references (a), (b) and (c) shall be furnished by Norfolk Naval Shipyard in a timely manner.
4. Material. The status of Bureau controlled materials will be furnished in the 90 day letter, NAVSHIPS 4661.
5. Plans. Mare Island Naval Shipyard is requested to furnish applicable planning information to Norfolk Naval Shipyard as soon as possible prior to the scheduled beginning date for the overhaul in accordance with the requirements of reference (d).
6. Operating Schedule. DEPCOMSUBLANT is requested to keep Norfolk and Mare Island Naval Shipyards advised of the ship's operating schedule for the period preceding the start of overhaul.
7. Comments. CO, USS CUTLASS is requested to notify Norfolk Naval Shipyard, Bureau of Ships and appropriate information addressees by speedletter which if any of the authorized alterations are completed or partially completed. In this regard state briefly what work has been done and list items of material not on board which are required to complete the ShipAlts. Negative reply not necessary.

LIST OF AUTHORIZED ALTERATIONS FOR USS CUTLASS (SS478)

Military Improvement and Operational Alterations

Priority	ShipAlt	ManDays	Brief	Material
OIP-19	SS872	20	Bilge Flooding Alarm Sys	SPCC
OIP-26	SS886	10	Sensing Unit Bridge Monitor	IA
OIP-79	SS879	30	Btry Connector Insul Caps	SPCC
OIP-81	SS725	100	Desurgers Hydr Plant Suct	IA
OIP-146	SS864	500	Stand ECM Mast	IA,BUSHIPS
MIP Function Identification				
1301	SS820	450	Ant Sys Imprv	IA or SY
1301	SS889	66	Floating Wire Ant Sys	IA,BUSHIPS
1301	SS891	265	Strmlined Whip Ant AT-350()/BRC	IA,BUSHIPS
1301	SS895	40	Emerg Tuner AN/BRA-6	ONBOARD
1301	SS896	132	Reliable Mast Erect Mech	IA
1303	SS909	20	Freq TT Sys:	IA,BUSHIPS
			AN/URA-17 } foundations & cabling only	IA,BUSHIPS
			TT-299/UG }	IA,BUSHIPS
1303	SS909	500	On-line Crypto: TSEC/KWR-37	IA,BUSHIPS
1304	SS910	450	Single Sideband: AN/URC-32	INSTALLED
			AN/URQ-9 Freq Stand	IA,BUSHIPS
			R-390 Recvr (2)	IA,BUSHIPS
			CV-591/URR Converter (1)	IA,BUSHIPS
1309	SS875	150	VLF Recvr AN/BRR-3	IA,BUSHIPS
1309	SS890	66	VLF Ant AT-317B/BRR	IA,BUSHIPS
1315	SS835	610	SUPRAD: R-1052/FRR (3)	IA,BUSHIPS
			RD-219A (2) } foundations &	IA,BUSHIPS
			HRB-330 (1) } cabling only	IA,BUSHIPS
1402	SS871	600	ECM AN/WLR-1	IA,BUSHIPS
1409	SS918	921	Direction Finder: AN/SRD-7 (Mast Only)	IA,BUSHIPS
9011	SS763	95	Electrolyte Agitation Sys (foundation & piping)	IA,BUSHIPS
9019	SS917	73	Velocity Record AN/BQH-1	IA,BUSHIPS
OIP-150	SS878	30	AN/UQN-7	IA,BUSHIPS

NOTE: ShipAlt SS864 - Reqn cable NSY Phila.
ShipAlt SS783 not authorized; CUTLASS does not have continuous ring seals.
ShipAlt SS763 "fans" to be delivered to ship for forces afloat installation.
ShipAlt SS834 not authorized; ShipAlt SS835 to be accomplished.
ShipAlts SS880 and SS894 not authorized, reported complete C.O. ltr Ser 327 of 14 June 62.
ShipAlt SS910 partially completed, the AN/URC-32 reported presently installed with AN/BRA-13 tuner by forces afloat.
ShipAlt SS895 (AN/BRA-6) material reported on board by C.O.
ShipAlts SS901, 888,897,898 and 793 not authorized; material not available this overhaul.

Calculations indicate that these alterations will result in a GM of 1.24'. If shipyard calculations confirm this figure then ShipAlt SS918 shall be deferred.

Figure 2 (Continued)

SHIP ALTERATION MATERIAL SUMMARY
NAVSHIPS 4661 (3-56) Address all replies to Chief, Bureau of Ships (Code)

TO: Commander, Norfolk Naval Shipyard | SHIP: USS CUTLASS (SS-478) | IN REPLY REFER TO: SS478 Ser 525-1972

VIA: | OVERHAUL PERIOD: 1/14/63 to 5/24/63 | DATE: 11 OCTOBER 1962

REF: BUSHIPS ltr SS478 Ser 525-1961 of 31 Aug 1962

☐ THIS LIST PROVIDES STATUS OF BUSHIPS SPECIAL MAT REQD FOR SHIPALTS AUTH FOR ACCOMP DURING AVLBTY INDICATED

ITEM NO	SHIPALT	MATERIAL DESCRIPTION	QTY	ESTIMATED DELIVERY DATE	SUPPLIER	CONTRACT NO. OR BSSO	REMARKS
F-6	835	R-1052/FRR	3	12/31/62	NSY NORVA		(1) 7307822579019 to NSC NORVA directs shipment to NSY NORVA
		Receiver					(2) 7307822579020 to NSC NORVA directs shipment of R-1053/FRR to NSY NORVA
		F5820-893-4794					
F-7	889	Line Wiper	1	12/62		NObsr-87722 BOWEN ITCO, INC.	Available 12/62
F-8	909	TSEC/KWR-37	2				Commanding Officer to obtain from RPIO when available
		Security Equipment					
F-9	909	TSEC/KWQ-4	1				Commanding Officer to obtain from RPIO when available
		Security Equipment					
F-10	909	SB-1203/UG	1	12/31/62	NSY NORVA		7307822609005 to NSC NORVA directs shipment to NSY NORVA
		TTY Transfer Panel, Non-Secure					
		F5820-473-6056					
F-11	909	SB-1210/UGQ	1	12/31/62	NSY NORVA		7307822609004 to NSC NORVA directs shipment to NSY NORVA

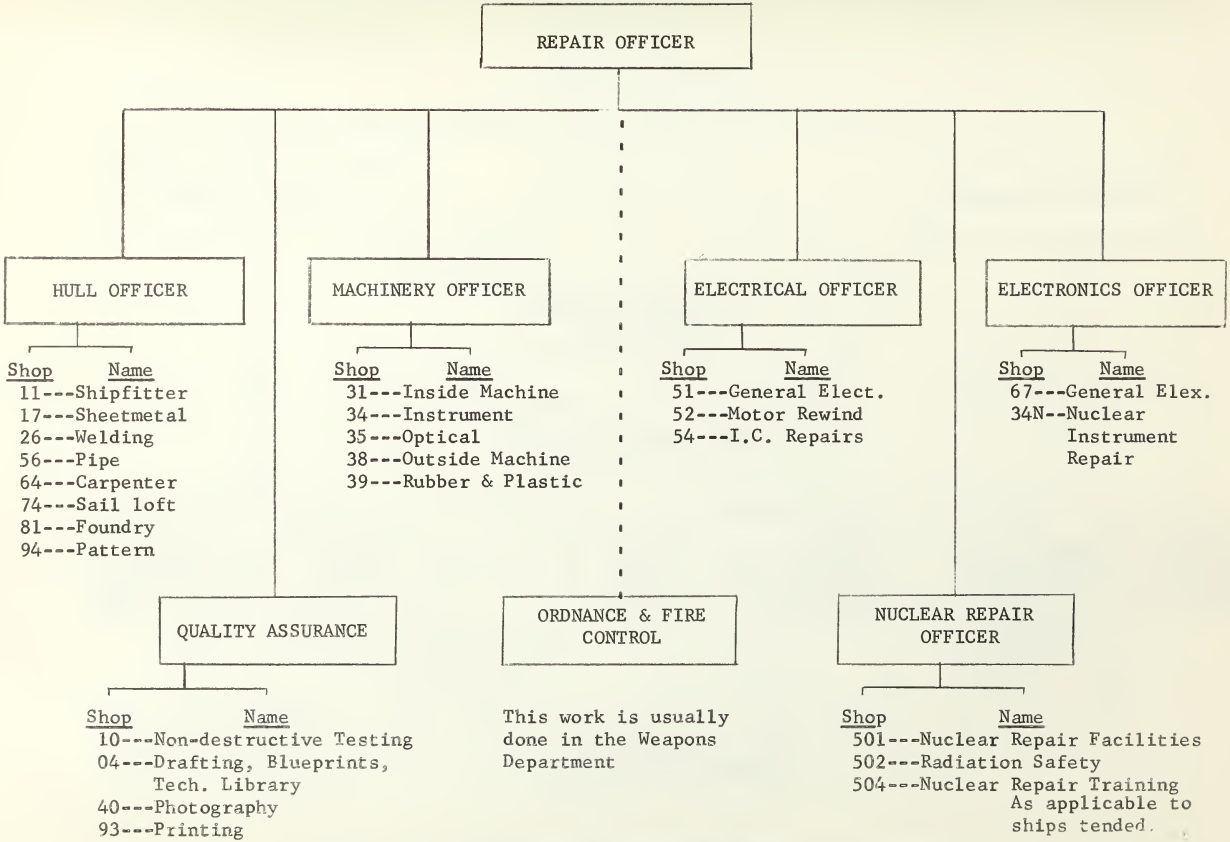


Figure 4. TYPICAL TENDER REPAIR DEPARTMENT ORGANIZATION

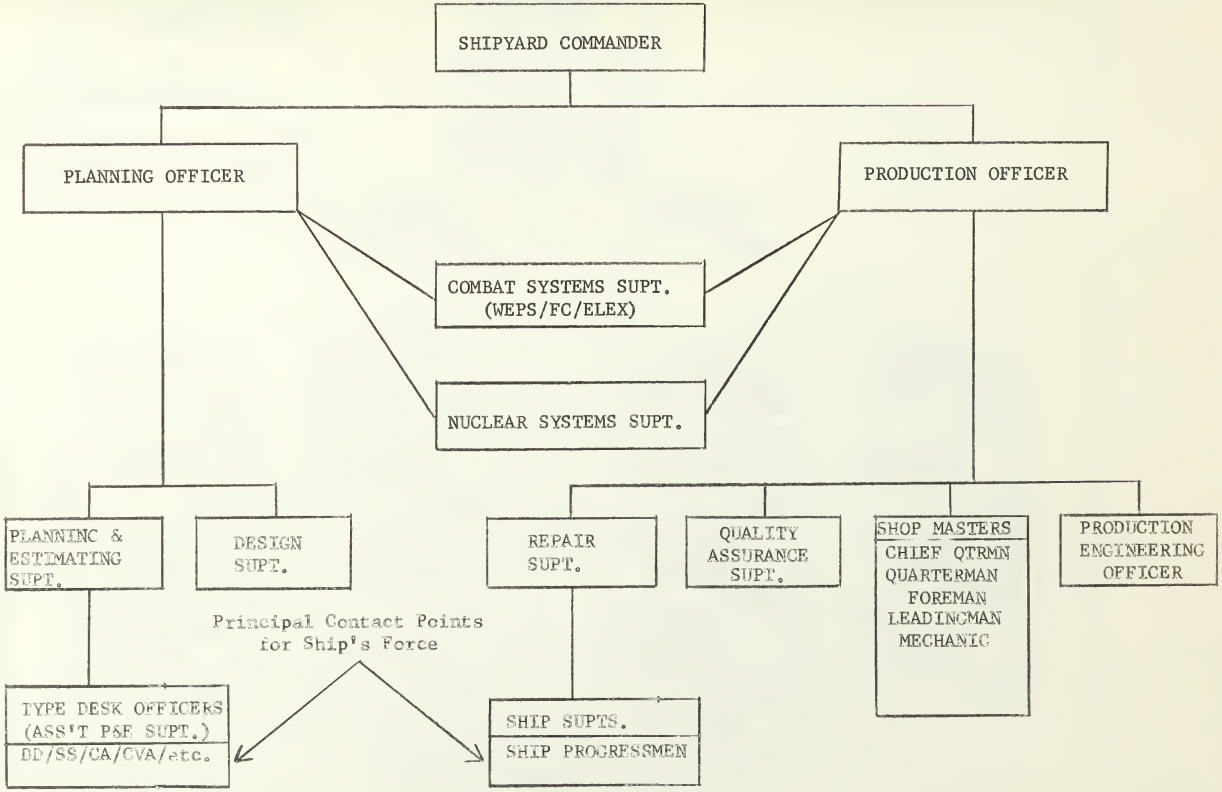


Figure 5. TYPICAL NAVAL SHIPYARD ORGANIZATION (PARTIAL)

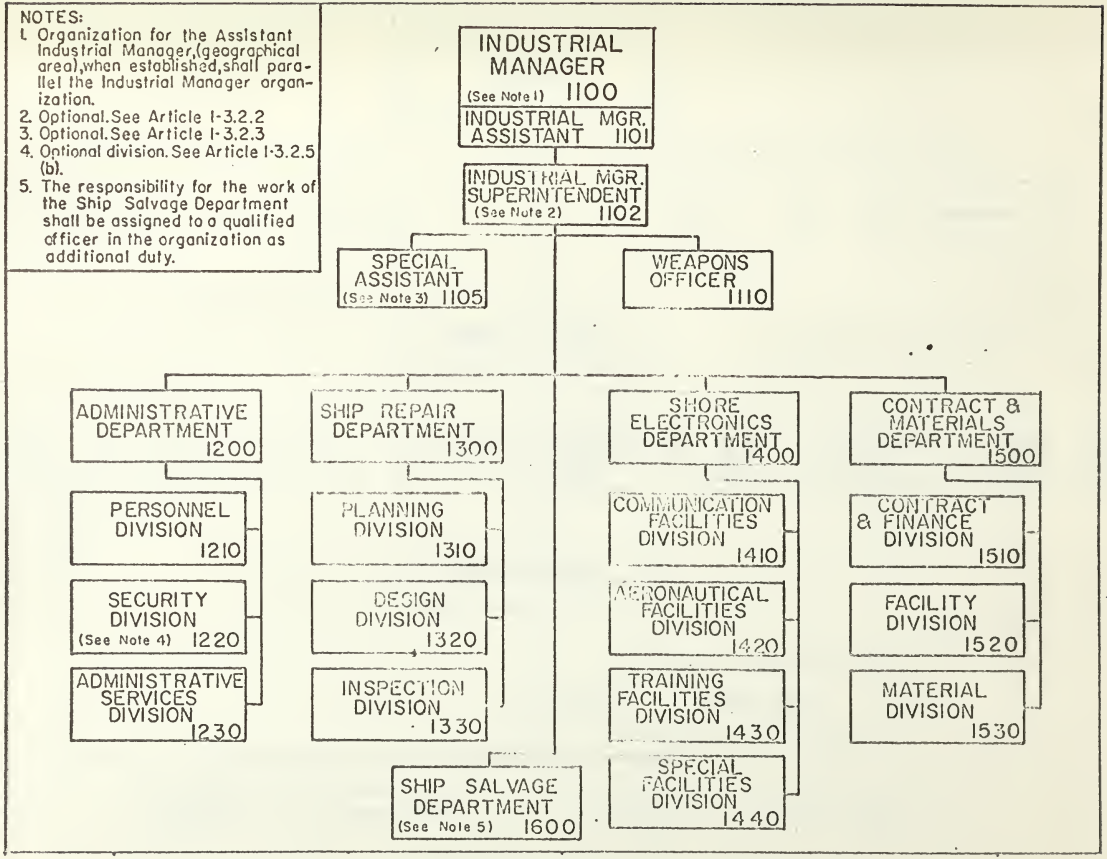


Figure 6
STANDARD ORGANIZATION FOR THE OFFICE OF THE INDUSTRIAL MANAGER

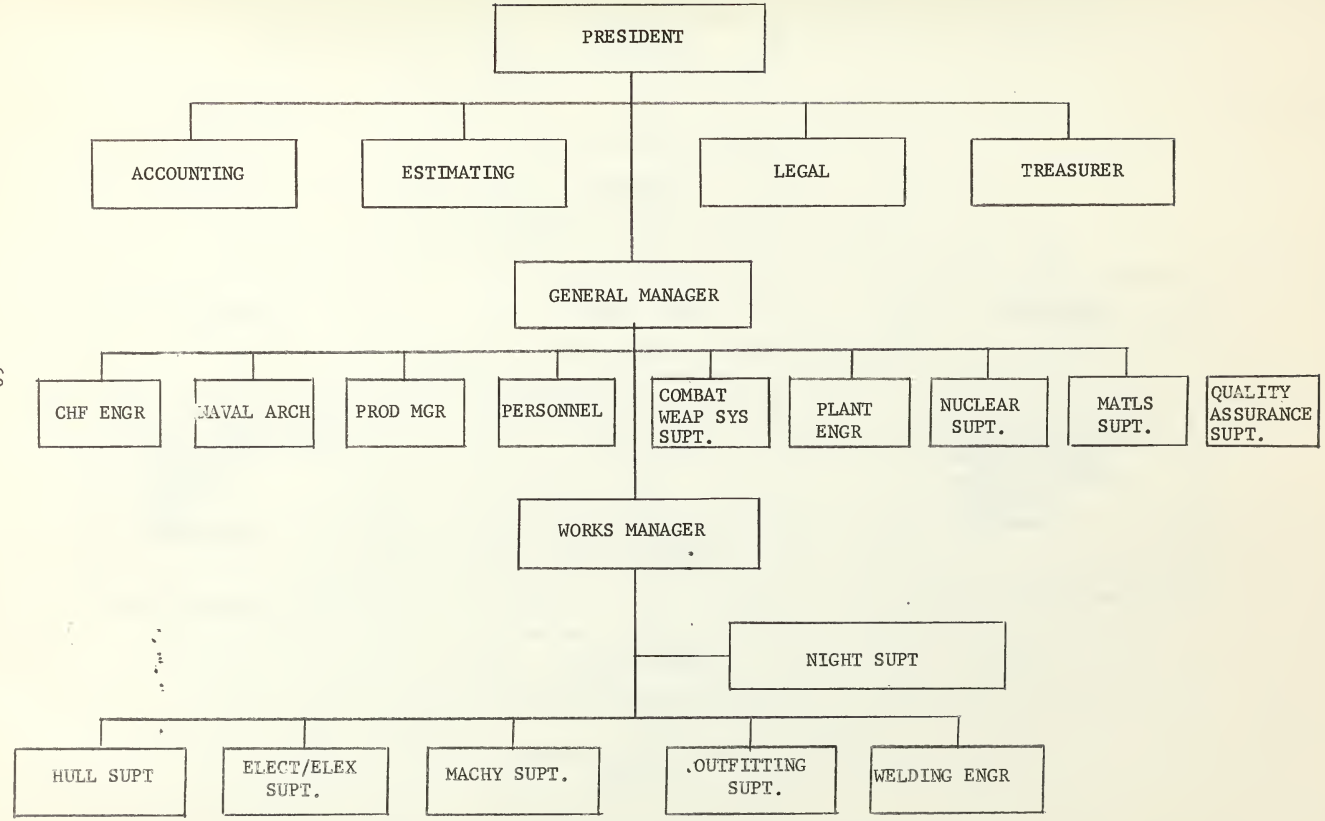


Figure 7. TYPICAL PRIVATE SHIPBUILDING YARD ORGANIZATION

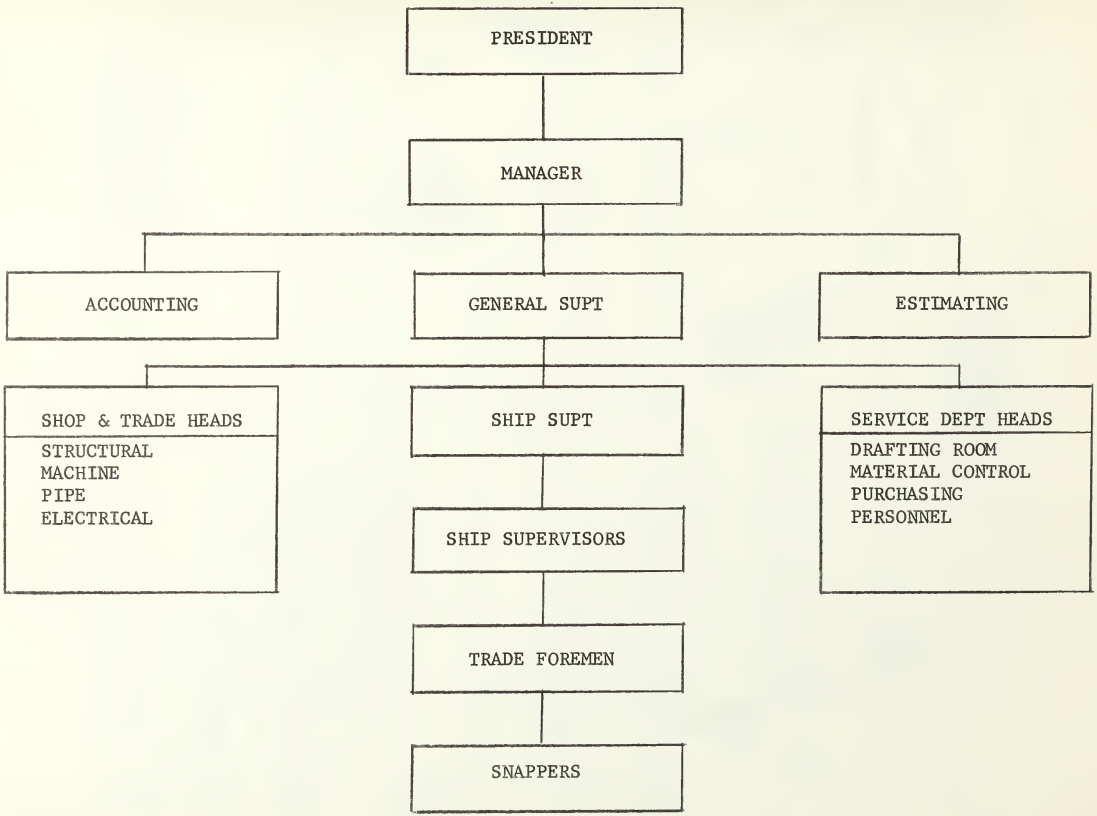
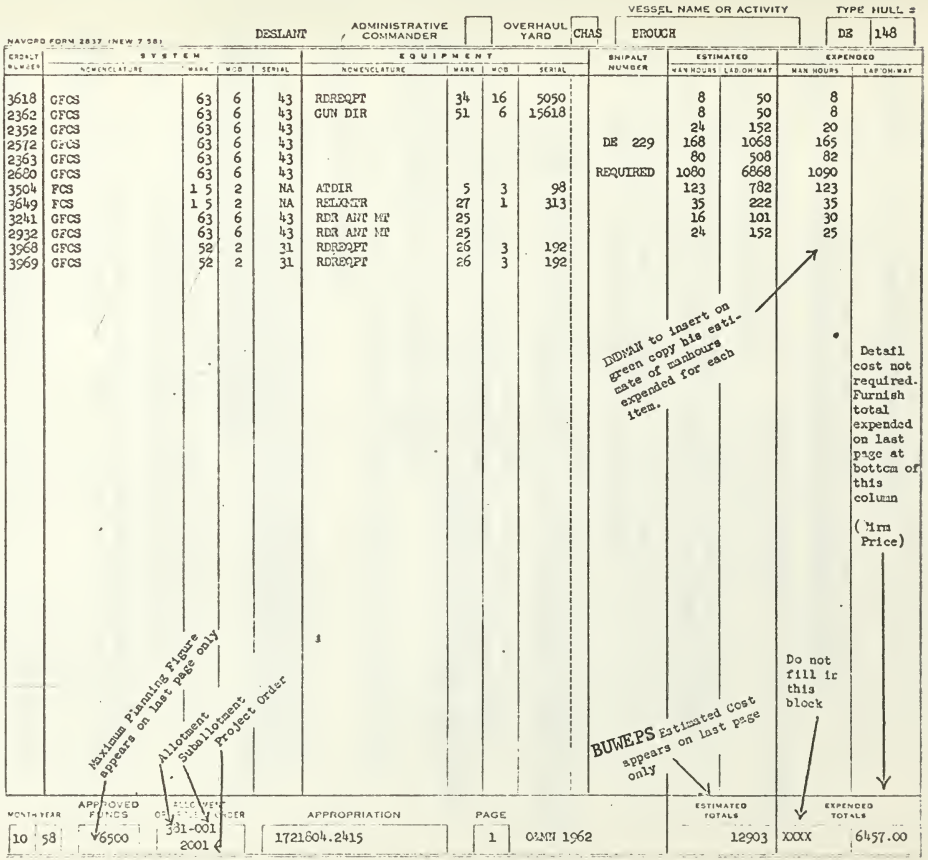


Figure 8. TYPICAL PRIVATE SHIP REPAIR YARD ORGANIZATION


ORDALT ACCOMPLISHMENT LIST
NAVORD FORM 2837 (NEW 7 58)
DESLANT
ADMINISTRATIVE COMMANDER
OVERHAUL YARD
CHAS
VESSEL NAME OR ACTIVITY
BROOKE
TYPE HULL #
DE 148
ORDALT NUMBER
SYSTEM
NOMENCLATURE
MARK
MOD
SERIAL
EQUIPMENT
NOMENCLATURE
MARK
MOD
SERIAL
SHIPALT NUMBER
ESTIMATED
MAN HOURS
LAB OH MAT
EXPENDED
MAN HOURS
LAB OH MAT
3618 GFCS 63 6 43 RDRBQPT 34 16 5050 8 50 8
2362 GFCS 63 6 43 GUN DIR 51 6 15618 8 50 8
2352 GFCS 63 6 43 24 152 20
2572 GFCS 63 6 43 DE 229 168 1063 165
2363 GFCS 63 6 43 80 508 82
2680 GFCS 63 6 43 REQUIRED 1080 6868 1090
3504 FCS 1 5 2 NA ATDIR 5 3 98 123 782 123
3649 FCS 1 5 2 NA RELXMTR 27 1 313 35 222 35
3241 GFCS 63 6 43 RDR ANT MT 25 16 101 30
2932 GFCS 63 6 43 RDR ANT MT 25 24 152 25
3968 GFCS 52 2 31 RDRBQPT 26 3 192
3969 GFCS 52 2 31 RDRBQPT 26 3 192
DUDYAN to insert on green copy his estimate of manhours expended for each item.
Detail cost not required. Furnish total expended on last page at bottom of this column
(Mrm Price)
Maximum Planning Figure appears on last page only
Allotment Suballotment Project Order
BUWEPS Estimated Cost appears on last page only
Do not fill in this block
MONTH YEAR
APPROVED FUNDS
ALLOTMENT SUBALLOTMENT ORDER
APPROPRIATION
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10 58
6500
331-001 2001
1721804.2415
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OAMN 1962
12903
XXXX
6457.00

Figure 9

FOOTNOTES

[1]Chief, Bureau of Ships letter serial 518B-405 of 10 December 1963 to Fleet Commanders-in-Chief.

[2]Chief of Naval Operations, OPNAV Instruction 5250.1A of 12 September 1961, Fleet Work Study Program.

[3]Chief of Naval Operations, OPNAV Instruction 4700.16A of 1 August 1963, Standard Navy Maintenance Management System.

[4]Department of the Navy, Review of Management of the Department of the Navy NAVEXOS P-2426B-4, of 2 November 1962.

[5]Chief of Naval Operations, OPNAV Instruction 04700.7C of 13 April 1962, General Policies Concerning Maintenance of Ships.

[6]Chief of Naval Operations, OPNAV Instruction 4700.2B of 18 February 1963, Priority of Work in Shipyards.

[7]Chief of Naval Operations, OPNAV Instruction 4700.14A of 29 April 1960, The Fleet Rehabilitation and Modernization (FRAM) Program.

[8]Chief of Naval Operations, OPNAV Instruction 4720.2A of 30 April 1963, Program for Military Improvement of Ships; OPNAV Instruction 4720.10A of 5 October 1961, Planning Procedures for Active Fleet Alterations; OPNAV Instruction 4720.49A of 2 May 1962, The Material Improvement Plan (Ships) Board.

[9]Chief of Naval Operations, OPNAV Instruction 04720 Series, Class Improvement Plans.

[10]Chief of Naval Operations, OPNAV Instruction 4720.12F of 30 April 1963, Material Improvement Plan (Ships) Fiscal Year 1964; Chief, Bureau of Ships, Fleet Improvement Plan for Accomplishment in Fiscal Year 1964 (NAVSHIPS 250-408-1).

[11]Chief of Naval Operations, OPNAV Instruction 4720.2A of 30 April 1963, Program for Military Improvements of Ships.

[12]The originator of contracts varies among Bureau of Ships, Bureau of Naval Weapons, and Bureau of Supplies and Accounts Field Activities.

[13]U. S. Navy Regulations, Chapter 20, is entitled Status and Maintenance of Naval Craft.

[14]Chief, Bureau of Ships, Bureau of Ships Technical Manual. The following chapters are of particular value during ship overhaul periods: Chapter 2, Publications and Plans; Chapter 6, Inspections, Records and Reports; Chapter 7, Docking Instructions; Chapter 8, Trials.

[15]Chief, Bureau of Ships, Ship Repair Contracting Manual (NAVSHIPS 250-710-1).

[16]Commander Submarine Force, U. S. Pacific Fleet letter serial 40/N 0116 of 30 January 1964, to Commander Service Force, U. S. Pacific Fleet.

[17]This comment is based on the author's personal experience. In addition to years served aboard ships including a tour as Commanding Officer of a submarine, the author has completed tours of duty as Squadron Engineer and Electronics Officer, as Repair Officer of Submarine Base at Pearl Harbor, and recently as Assistant Branch Head, Submarine Branch of Bureau of Ships, with primary responsibility for the Fleet Maintenance Program for all deisel-electric submarines.

[18]Pearl Harbor Naval Shipyard, "Make the Most of Your Overhaul", Bureau of Ships Journal, November 1960, pp. 5-10.

[19]Ibid., p. 5.

[20]Ibid., p. 8.

[21]Chief, Bureau of Ships, Guide for Financial Management of Naval Shipyards (NAVSHIPS 250-704), April 1963, pp. 1-26.

[22]Ibid., pp. 19-20.

[23]Chief, Bureau of Ships, Ship Repair Contracting Manual (NAVSHIPS 250-710-1), August 1962, Chapter 16; Bureau of Ships Instruction 4720.6, Design Work Responsibilities for Ship Alterations and Assignment of Planning Yards.

[24]Chief, Bureau of Ships, Ship Repair Contracting Manual (NAVSHIPS 250-710-1), August 1962.

[25]F. G. Fassett, Jr. (Editor), The Shipbuilding Business in the United States of America, 2 vols. New York: Society of Naval Architects and Marine Engineers, 1948, I, 256-270.

[26]Robert Schor, A Method for Increasing the Efficiency of Ship Repair Yard Operation, a paper presented to the Society of Naval Architects and Marine Engineers, Spring Meeting in Philadelphia, Penna., 19-20 May, 1955, pp. 2-3.

[27]Figure 9 is a sample of a BUWEPS ORDALT Accomplishment List.

[28]Commander in Chief, U. S. Pacific Fleet Instruction 4441.2A establishes supply overhaul as an integral part of each shipyard overhaul period, as a means toward improving the supply readiness of Pacific Fleet ships. A similar instruction has been issued for Atlantic Fleet ships.

[29]Commander in Chief, U. S. Pacific Fleet, Supply Operations Assistance Program Brochure, no date.